



**Corridor Program**

Congestion Relief & Bus Rapid Transit Projects

# **APPENDIX P6**

## **JARPA Application**

### **I-405, SR520 to SR522 Stage 1 (Kirkland Stage 1)**

**Request For Proposal**  
**July 15, 2005**



**Washington State  
Department of Transportation**



**AGENCY USE ONLY**

Agency Reference #: 200401410

Date Received:

Circulated by:

(local govt. or agency)

**JOINT AQUATIC RESOURCES PERMIT APPLICATION FORM (JARPA)**

(for use in Washington State)

**PLEASE TYPE OR PRINT IN BLACK INK****November 18, 2004****Reference: 200401410**

- ☐ Application for a Fish Habitat Enhancement Project per requirements of RCW 77.55.290. You must submit a copy of this completed JARPA application form and the (Fish Habitat Enhancement JARPA Addition) to your local Government Planning Department and Washington Department of Fish & Wildlife Area Habitat Biologist on the same day.

**NOTE: LOCAL GOVERNMENTS – You must submit any comments on these projects to WDFW within 15 working days.**

Based on the instructions provided, I am sending copies of this application to the following: *(check all that apply)*

- ☒ Local Government for shoreline: ☐ Substantial Development ☐ Conditional Use ☐ Variance ☐ Exemption ☐ Revision  
☐ Floodplain Management ☒ Critical Areas Ordinance

(SSDP may be from the City of Bothell for the North Creek compensatory wetland mitigation site)

- ☒ Washington Department of Fish and Wildlife for HPA (Submit 3 copies to WDFW Region)  
☒ Washington Department of Ecology for 401 Water Quality Certification (to Regional Office-Federal Permit Unit)  
☐ Washington Department of Natural Resources for Aquatic Resources Use Authorization Notification  
☒ Corps of Engineers for: ☒ Section 404 ☐ Section 10 permit  
☐ Coast Guard for General Bridge Act Permit  
☒ For Department of Transportation projects only: This project will be designed to meet conditions of the most current Ecology/Department of Transportation Water Quality Implementing Agreement

**SECTION A - Use for all permits covered by this application. Be sure to ALSO complete Section C (Signature Block) for all permit applications.**

**1. APPLICANT**

Attn.: Kimberly Farley, Environmental Manager  
Washington State Department of Transportation, I-405 Congestion Relief and Bus Rapid Transit Projects –  
I-405, SR520 to SR522

**MAILING ADDRESS**

I-405 Project Office, 600 108<sup>th</sup> Avenue NE, Suite 405, Bellevue, WA 98004

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425-456-8500

**E-MAIL ADDRESS**

farleyk@wsdot.wa.gov

**HOME PHONE****FAX #**

425-456-8600

**If an agent is acting for the applicant during the permit process, complete #2. Be sure agent signs Section C (Signature Block) for all permit applications**

**2. AUTHORIZED AGENT**

Chad Durand, Permit Specialist

**MAILING ADDRESS**

I-405 Project Office, 600 108<sup>th</sup> Avenue NE, Suite 405, Bellevue, WA 98004

**WORK PHONE**

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**HOME PHONE****FAX #**

425-456-8600

**3. RELATIONSHIP OF APPLICANT TO PROPERTY:** ☒ OWNER ☒ PURCHASER ☐ LESSEE ☐ OTHER:

**4. NAME, ADDRESS, AND PHONE NUMBER OF PROPERTY OWNER(S), IF OTHER THAN APPLICANT:**

I-405 Corridor

Washington State Department of Transportation

I-405 Project Office, 600 108<sup>th</sup> Avenue NE, Suite 405, Bellevue, WA 98004

**5. LOCATION (STREET ADDRESS, INCLUDING CITY, COUNTY AND ZIP CODE, WHERE PROPOSED ACTIVITY EXISTS OR WILL OCCUR)**

An approximately 7.6-mile portion of the I-405 Corridor extending from the north side of the I-405/SR520 interchange to

the south side of the I-405/SR522 interchange (Permit Plans, Sheet 1). LOCAL GOVERNMENT WITH JURISDICTION (CITY OR COUNTY) <b>City of Kirkland, City of Bothell, and King County</b>																																																														
WATERBODY YOU ARE WORKING IN Unnamed Streams C-5, C-19, C-20, C-28, C-29 Forbes Creek (project work) Forbes Lake, North Creek (mitigation sites) Juanita Creek (tributaries only)  IS THIS WATERBODY ON THE 303(d) LIST? YES <input checked="" type="checkbox"/> NO <input type="checkbox"/> IF YES, WHAT PARAMETER(S)? Forbes Lake: Total Phosphorus Forbes Creek, Juanita Creek, North Creek: Dissolved oxygen, Fecal Coliform, Temperature, Mercury, alpha-Endosulfan, Ammonia-N, Arsenic, beta-Endosulfan, Cadmium, Chlorpyrifos, Chromium, Copper, Endosulfan, Lead, Nickel, Pentachlorophenol, pH, Selenium, Silver, Zinc (Juanita Creek also listed for Hexachlorobenzene) <a href="http://www.ecy.wa.gov/programs/wq/links/impaired_wtrs.html">http://www.ecy.wa.gov/programs/wq/links/impaired_wtrs.html</a> WEBSITE FOR 303d LIST	TRIBUTARY OF See below	WRIA # 8																																																												
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LATITUDE & LONGITUDE: See Attachment 1  Lat/Long at approximate project center: 47.6882 N; 122.1812 W	ZONING DESIGNATION See Attachment 1																																																													
TAX PARCEL NO: See Attachment 1	DNR STREAM TYPE, IF KNOWN <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;"><u>Stream</u></th> <th style="text-align: left;"><u>Tributary to</u></th> <th style="text-align: left;"><u>Type</u></th> </tr> </thead> <tbody> <tr><td>C5</td><td>Yarrow Creek</td><td>4</td></tr> <tr><td>C18</td><td>Forbes Creek</td><td>4</td></tr> <tr><td>C19</td><td>Forbes Creek</td><td>4</td></tr> <tr><td>C22</td><td>Forbes Creek</td><td>4</td></tr> <tr><td>C28</td><td>Juanita Creek</td><td>4</td></tr> <tr><td>C29</td><td>Juanita Creek</td><td>4</td></tr> <tr><td>KL1 (Yarrow Creek)</td><td>Lk Washington</td><td>2</td></tr> <tr><td>KL2</td><td>Lk Washington</td><td>4</td></tr> <tr><td>KL3</td><td>KL4</td><td>4</td></tr> <tr><td>KL4</td><td>Lk Washington</td><td>4</td></tr> <tr><td>KL5 (Forbes Creek)</td><td>Lk Washington</td><td>3</td></tr> <tr><td>KL6</td><td>KL5</td><td>3</td></tr> <tr><td>KL8</td><td>KL5</td><td>4</td></tr> <tr><td>KL12</td><td>KL5</td><td>3</td></tr> <tr><td>KL13 (Juanita Creek)</td><td>Lk Washington</td><td>3</td></tr> <tr><td>KL14</td><td>Sammamish River</td><td>4</td></tr> <tr><td>KL14 North</td><td>Sammamish River</td><td>4</td></tr> <tr><td>KL15 (Sammamish River)</td><td>Lk Washington</td><td>1</td></tr> <tr><td>North Ck (Mitigation site)</td><td>Sammamish River</td><td>3</td></tr> </tbody> </table>		<u>Stream</u>	<u>Tributary to</u>	<u>Type</u>	C5	Yarrow Creek	4	C18	Forbes Creek	4	C19	Forbes Creek	4	C22	Forbes Creek	4	C28	Juanita Creek	4	C29	Juanita Creek	4	KL1 (Yarrow Creek)	Lk Washington	2	KL2	Lk Washington	4	KL3	KL4	4	KL4	Lk Washington	4	KL5 (Forbes Creek)	Lk Washington	3	KL6	KL5	3	KL8	KL5	4	KL12	KL5	3	KL13 (Juanita Creek)	Lk Washington	3	KL14	Sammamish River	4	KL14 North	Sammamish River	4	KL15 (Sammamish River)	Lk Washington	1	North Ck (Mitigation site)	Sammamish River	3
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6. DESCRIBE THE CURRENT USE OF THE PROPERTY, AND STRUCTURES EXISTING ON THE PROPERTY. HAVE YOU COMPLETED ANY PORTION OF THE PROPOSED ACTIVITY ON THIS PROPERTY? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO FOR ANY PORTION OF THE PROPOSED ACTIVITY ALREADY COMPLETED ON THIS PROPERTY, INDICATE MONTH AND YEAR OF COMPLETION.  The property is part of the I-405 Corridor, a major urban highway right-of-way owned by the Washington State Department of Transportation. I-405 runs through the right-of-way. No portion of the proposed activity has been completed on this property.  IS THE PROPERTY AGRICULTURAL LAND? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO ARE YOU A USDA PROGRAM PARTICIPANT? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO																																																														

7a. DESCRIBE THE PROPOSED WORK THAT NEEDS AQUATIC PERMITS: COMPLETE PLANS AND SPECIFICATIONS SHOULD BE PROVIDED FOR ALL WORK WATERWARD OF THE ORDINARY HIGH WATER MARK OR LINE, INCLUDING TYPES OF EQUIPMENT TO BE USED. IF APPLYING FOR A SHORELINE PERMIT, DESCRIBE ALL WORK WITHIN AND BEYOND 200 FEET OF THE ORDINARY HIGH WATER MARK. IF YOU HAVE PROVIDED ATTACHED MATERIALS TO DESCRIBE YOUR PROJECT, YOU STILL MUST SUMMARIZE THE PROPOSED WORK HERE. ATTACH A SEPARATE SHEET IF ADDITIONAL SPACE IS NEEDED.

*Note: Attachments and Appendices are included with this JARPA. MAP Team members are on distribution lists for those Discipline Reports and Technical Studies which they requested.*

**List of Attachments:**

- 1 Site Information
- 2 Figures (Sheets 1 through 53)
- 3 Mailing Labels for Notification of Adjacent Property Owners (only the Army Corps receives these labels)
- 4 Instructional Letter IL 4055.02, Environmental Compliance Assurance Procedure for Construction Projects and Activities
- 5 Appendix C: Fish Passage of the WDFW and WSDOT MOA Concerning Construction Projects in State Waters
- 6 Implementing Agreement between WSDOT and Ecology Regarding Compliance with the State of Washington Surface Water Quality Standards (February 1998)
- 7 Compliance Implementing Agreement between Ecology and WSDOT Regarding Compliance with the State of Washington Surface Water Quality Standards (November 1, 2004)
- 8 USFWS ESA Concurrence Letter
- 9 NOAA ESA and MSA EFH Concurrence Letter
- 10 Conceptual Wetland Mitigation Discipline Report
- 11 Wetland/Biology Report
- 12 Draft Wetland Mitigation Plan

**Appendices:**

- A Culverts
- B Stormwater
- C Streams and Aquatic Resources
- D Wetlands
- E Groundwater

**Discipline Reports and Technical Studies (these are not attachments):**

Wetlands Discipline Report  
Preliminary Hydraulic Report  
Surface Water and Floodplains Discipline Report  
Water Quality Discipline Report  
Forbes Creek Fish Passage Design Plans  
Fish and Aquatic Resources Discipline Report  
Supplemental Stream Habitat Survey Report and Impact Assessment for the Fish and Aquatic Resources Discipline Report

**INTRODUCTION**

The I-405, SR520 to SR522 Project improvement area encompasses approximately 7.6 miles from the north side of the I-405 and SR 520 interchange and extends northward to the south side of the I-405 and SR 522 interchange (see Permit Plans, Sheet 1). Principal features of the I-405, SR520 to SR522 Project are:

- Roadway construction to add a northbound general-purpose lane from the I-405 and NE 70th Street interchange to the I-405 and NE 124th Street interchange
- Roadway construction to add a southbound general-purpose lane from the I-405 and SR 522 interchange to the I-405 and SR 520 interchange
- Reconstruction, realignment, and reconfiguration of the I-405 and NE 116th Street interchange
- Retrofit of stormwater facilities at Forbes Creek to eliminate a fish passage barrier
- Changes to NE 116<sup>th</sup> Street and NE 120<sup>th</sup> Ave, as necessary, for interchange improvements
- Stormwater management to provide runoff detention, water quality treatment and conveyance system upgrades
- Project activities to avoid or minimize impacts or to compensate for unavoidable impacts to natural resources
- Wetland Mitigation
- Repair of road hazard areas, i.e., slide areas

The purpose of the I-405, SR520 to SR522 Project is to relieve traffic congestion by implementing the roadway improvements described below.

## Roadway Improvements

Permit Plans, Sheets 2 through 25 show the existing highway and the proposed improvements. Sheets 26 through 45 show cross sections throughout the corridor that are referenced on the plan sheets. Sheets 46 through 48 show typical headwalls used to avoid culvert extension impacts. Sheets 49 through 53 show details of the proposed work at Forbes Creek.

Elements of the roadway improvements are described below beginning in Kirkland and moving northbound toward Bothell, returning to Kirkland in the southbound lanes.

### Mainline

- Northbound, North of SR-520 Interchange to NE 70th Street (MP 15.9 to 17.4) (Permit Plans, Sheets 2 to 6; see Permit Plans, Sections A-A through E-E on Sheets 26 to 32): No changes are proposed for this section of roadway. This segment will continue to employ four general-purpose lanes and one HOV lane.
- Northbound, NE 70th Street to NE 85th Street (MP 17.4 to 18.2) (Permit Plans, Sheets 6 to 8): WSDOT proposes one additional general-purpose lane for a total of four general-purpose lanes and one HOV lane. The existing drop lane (exit only) from the NE 70th Street off-ramp will become a through lane. The existing bridges over NE 85th Street will remain unchanged. Restriping over these bridges will accommodate the additional lane, resulting in narrow lanes and non-standard shoulders. The pavement will be widened to the east in select areas to provide space for emergency vehicles.
- Northbound, NE 85th Street to NE 116th Street (MP 18.2 to 19.9) (Permit Plans, Sheets 8 to 13; see Permit Plans, Sections F-F through H-H on Sheets 33 to 36): WSDOT proposes one additional general-purpose lane for a total of four general-purpose lanes and one HOV lane. The existing pavement will be widened by 10 to 15 feet to the east beginning at the on-ramp from NE 85th Street. (For improvements to the 116th interchange, see Interchanges below.)
- Northbound, NE 116th Street to NE 124th Street (MP 19.9 to 20.4) (Permit Plans, Sheets 13 to 16): WSDOT will continue the new general-purpose lane added from the south for a total of four general-purpose lanes and one HOV lane. The existing pavement will be widened by 10-15 feet to the east to accommodate the new lane. The new general-purpose lane will become a drop lane (exit only) at NE 124th Street.
- Northbound, NE 124th Street to SR-522 (MP 20.4 to 23.4) (Permit Plans, Sheets 16 to 24; see Permit Plans, Sections I-I through O-O on Sheets 37 to 45): North of the NE 124th Street off-ramp, WSDOT does not propose any changes to the roadway; it will remain as three general-purpose lanes and one HOV lane.
- Southbound, SR-522 to NE 160th Street (MP 23.4 to 22.6) (Permit Plans, Sheets 25 to 22; see Permit Plans, Sections O-O and N1-N1 on Sheets 45 and 44): WSDOT proposes one additional general-purpose lane in this area for a total of four general-purpose lanes and one HOV lane. The additional lane will connect to the existing merge lane from the eastbound SR 522 connector (to southbound I-405). The existing pavement will be widened up to 15 feet to the west to accommodate the new lane.
- Southbound, NE 160th Street to NE 124th Street (MP 22.6 to 20.1) (Permit Plans, Sheets 22 to 15; see Permit Plans, Sections M-M through I-I on Sheets 43 to 37): WSDOT proposes one additional general-purpose lane in this area for a total of four general-purpose lanes and one HOV lane. The existing pavement will be widened by 10 to 15 from the NE 160<sup>th</sup> Street interchange southward to approximately NE 132<sup>nd</sup> Street. From approximately MP 21.7 to 21.0 the roadway will be widened to the east (median). From NE 132<sup>nd</sup> Street to NE 124<sup>th</sup> Street, no additional widening will be necessary. Pavement placed as part of the Sound Transit Direct Access 128<sup>th</sup> Project will be restriped. The on-ramp from NE 160th Street will be reconstructed to accommodate the additional southbound lane. No in-water work or work below the OHWL will occur.
- Southbound, NE 124th Street to NE 116th Street (MP 20.1 to 19.9) (Permit Plans, Sheets 15 to 13): WSDOT proposes one additional general-purpose lane in this area for a total of four general-purpose lanes and one HOV lane. The project will tie into the proposed Sound Transit Direct Access 128<sup>th</sup> Project. For improvements to the 116th interchange, see Interchanges below.
- Southbound, NE 116th Street to NE 85th Street (MP 19.9 to 18.2) (Permit Plans, Sheets 13 to 8; see Permit Plans, Sections H-H through F-F on Sheets 36 to 33): WSDOT proposes one additional general-purpose lane in this area for a total of four general-purpose lanes and one HOV lane. The existing pavement will be widened by 10 to 15 feet to the west.
- Southbound, NE 85th Street to NE 70th Street (MP 18.2 to 17.4) (Permit Plans, Sheets 8 to 6): WSDOT proposes one additional general-purpose lane in this area for a total of four general-purpose lanes and one HOV lane. The existing pavement will be widened by 10 to 15 feet to the west.
- Southbound, NE 70th Street to SR-520 (MP 17.4 to 15.9) (Permit Plans, Sheets 6 to 2; see Permit Plans, Sections E-E through A-A on Sheets 32 to 26): WSDOT proposes one additional general-purpose lane in this area for a total of four general-purpose lanes and one HOV lane. The existing pavement will be widened by 10

to 15 feet to the west. The new lane will tie into the existing add lane for the connection to the SR-520 interchange, which is located approximately 330 feet north of the Bellevue city boundary

### Interchanges

#### *NE 116th Street Interchange (MP 19.8) (Permit Plans, Sheets 13 and 14)*

The I-405 and NE 116th Street interchange, which is presently configured as a half-diamond, will be reconstructed as a half single-point urban interchange (SPUI). Elements of the interchange improvements will include:

- Reconstructing, phased removal and replacement of the northbound and southbound I-405 bridges over NE 116th Street. The bridges will be rebuilt to accommodate the new northbound and southbound lanes, and will provide greater vertical clearance over NE 116th Street.
- Reconstructing the northbound off-ramp and southbound on-ramp in the new half-SPUI configuration.
- Widening NE 116th Street on both sides of the interchange to accommodate dual-turn entrance and exit ramps. On the west side of the interchange, the widening (on both sides of the street) will extend for approximately 1,700 feet, tapering from approximately 58 feet at the interchange to 43 feet at the west end. East of the interchange, both sides of NE 116th Street will be widened for approximately 900 feet. The curb-to-curb width will be approximately 70 feet from the interchange to the intersection at 124th Avenue NE.
- Reconstructing the NE 116th Street bridge over the BNSF railroad tracks.
- Reconstructing the 120th Avenue NE and NE 116th Street intersection.

### Other Interchange Improvements

Several existing traffic safety issues will be addressed by I-405, SR520 to SR522 Project improvements. These issues will be addressed by rebuilding existing pavement, changing traffic signalization, or adding turn lanes. These improvements are not further discussed unless they impact jurisdictional sensitive areas.

### Retaining Walls and Noise Walls

There are 17 retaining walls proposed in the I-405, SR520 to SR 522 Project, however, only those associated with sensitive areas are discussed in this JARPA.

Retaining Wall 3000 is located within the buffer of wetland 16.5L, however, this wetland is a total loss associated with road widening (Permit Plans, Sheet 3).

A noise wall will be constructed in proximity to the buffer for Wetland 18.0R (Permit Plans, Sheet 7).

A noise wall and Retaining Wall 3005 will be constructed within Wetland 18.4R, however, this wetland is a total loss due to construction of an ecology embankment (Permit Plans, Sheet 9).

Retaining Wall 3010 is located within the buffer of wetland 19.5L, however, this wetland is a total loss due to fill associated with road widening and a stormwater vault (Permit Plans, Sheet 12).

Retaining Wall 3020 is located within wetland 19.3R and buffer, however, this wetland is a total loss associated with road widening and installation of an ecology embankment (Permit Plans, Sheets 12 and 13).

Retaining Wall 3030 is located within the buffer of wetland 19.6R, however, this wetland is a total loss associated with re-alignment of the NE 116<sup>th</sup> Street interchange (Permit Plans, Sheet 13).

Retaining Wall 3030 is located within Jurisdictional Area C and it intersects Jurisdictional Ditch 8 (Permit Plans, Sheet 13).

Retaining Wall 3040 intersects Jurisdictional Ditch 6, however, this jurisdictional ditch is a total loss associated with re-alignment of the NE 116<sup>th</sup> Street interchange (Permit Plans, Sheets 12 and 13).

A noise wall will be constructed over Stream KL-13, Juanita Creek, within the impact line at MP 21.9, however, the stream is in a culvert at this location and no aquatic or riparian impacts will occur (Permit Plans, Sheet 20).

Retaining Wall 3150 is located along the west side of the southbound lanes, adjacent to the 160<sup>th</sup> Street interchange off-ramp. This retaining wall is used to minimize impacts to Wetland 22.8L, however, it is located within that wetland. Retaining Wall 3150 is also partially within an erosion hazard area as designated by King County (Permit Plans, Sheet 23).

Noise walls will also be constructed in the erosion hazard area. These walls will be constructed along the east side of the roadway from approximately MP 22.75 to MP 22.94 (Permit Plans, Sheet 23).

Retaining Wall number 3160 is located along the west side of the southbound lanes, between MP 23.03 and 23.08 (Permit Plans, Sheets 23 and 24). This retaining wall is within an erosion hazard area as designated by King County. Project geologists have identified this area as a steep landslide area. Seepage is evident in the slide face, and erosion has occurred to within 60 feet of the pavement edge. In order to prevent further deterioration of the slide face, the following elements or combination of elements will be constructed: horizontal drains installed into the slide to drain the

area, surficial drains installed along the freeway to convey stormwater runoff to detention sites, rock fill placed along the slide face to buttress selected areas of the slide face, and construction of a retaining wall approximately 100 feet long downslope from the freeway. The retaining wall will be composed of either soldier piles and lagging or contiguous concrete caissons/piling installed to a depth of some 30 to 40 feet. These piles may be further supported by tieback elements. Impacts associated with this retaining wall include temporary erosion associated with grading, and removal of vegetation. The proposed drainage system at this location will also eliminate roadway runoff from exacerbating the geological hazard area. The I-405 Team is working with King County DDES to identify performance standards to include in the RFP and permit conditions that will set guidelines for the contractor to use when designing the retaining wall.

### Culverts

There are 43 culverts crossing I-405 within the I-405, SR520 to SR522 project limits. This section of the JARPA only discusses those that require construction in proximity to jurisdictional areas. Appendix A describes all work associated with culverts.

- Culvert 1 See Permit Plans, Sheets 2 and 27. Replace 190 feet of pipe. The culvert will discharge to a proposed detention pond. Jurisdictional Ditch 1 will be impacted due to road widening. A new ditch will be constructed to the west of the widened roadway. An ecology embankment will be constructed along the western roadway embankment. Outfalls to new piped conveyance system flowing to the new detention pond.
- Culvert 2 See Permit Plans, Sheets 2 and 28, and Photo Figures 1, 2, 3 and 4 in Appendix A. Extend culvert approximately 13 feet westward of the roadway. Roadway widening, and subsequent culvert lengthening, will impact Wetland 16.3L. Outfalls to existing conveyance system flowing to Wetland 16.2R on the east side of I-405.
- Culvert 3 See Permit Plans, Sheets 2 and 29, and Photo Figures 5, 6 and 7 in Appendix A. Extend culvert approximately 15 feet westward of the roadway. Jurisdictional Ditch 2 will be impacted due to road widening. A new ditch will be constructed to the west of the widened roadway. An ecology embankment will be constructed along the western roadway embankment. Outfalls to existing conveyance system flowing down the slope towards 116<sup>th</sup> Street on the east side of I-405.
- Culvert 4 See Permit Plans, Sheets 3 and 30, and Photo Figures 8, 9 and 10 in Appendix A. Extend culvert 15 feet westward of the roadway. Wetland 16.5L will be a total loss due to road widening. A new ditch will be constructed to the west of the widened roadway. An ecology embankment will be constructed along the western roadway embankment. Outfalls to existing conveyance system flowing down the slope towards 116<sup>th</sup> Street along the east side of I-405.
- Culvert 5 See Permit Plans, Sheets 3 and 31, and Photo Figures 11, 12 and 13 in Appendix A. Extend culvert 15 feet westward of the roadway. This culvert will drain a new ditch to the west of the widened roadway. Stream C-5 runs through this culvert. Inlet protection at the west end of the culvert will impact Stream C-5, which discharges near Yarrow Creek. These impacts are included in the permanent stream impacts below OHWM in Table A-1. Outfalls to existing open ditch, which flows to a piped system, discharging near Yarrow Creek.
- Culvert 16 See Permit Plans, Sheet 9 and Photo Figure 18 in Appendix A. Extend culvert 20 feet westward and 15 feet eastward of the roadway. Ecology embankments will be constructed along both the western and eastern roadway embankments. Outfalls to roadside ditch, which outfalls to Forbes Lake.
- Culvert 18 See Permit Plans, Sheet 10, and Photo Figures 21, 22 and 23 in Appendix A. Extend culvert 25 westward of the roadway. Install a headwall on the east side of the culvert. Stream C-18 runs through this culvert. Outlet protection at the east end of the culvert will impact Stream C-18, which discharges to Stream KL-5 (Forbes Creek). These impacts are included in the permanent stream impacts below OHWM in Table A-1. Outfalls to Stream C-18. In-water work is unavoidable at this site.
- Culvert 19 See Permit Plans, Sheets 10, 11 and 34, and Photo Figures 24, 25, 26 and 41 in Appendix A. Extend culvert 20 feet westward of the roadway. Stream C-19 runs through this culvert. Inlet protection at the west end of the culvert will impact Stream C-19, which discharges to Stream KL-5 (Forbes Creek). These impacts are included in the permanent stream impacts below OHWM in Table A-1. Outfalls to Stream C-19. In-water work is unavoidable at this site.
- Culvert 20 See Permit Plans, Sheets 11, 49, 50, 51, 52, 53, and Photo Figures 27 and 28 in Appendix A. Retrofit for fish passage will include installation of 450 feet of culvert. Inlet and outlet protection will impact Stream KL-5 (Forbes Creek). These impacts are included in the permanent stream impacts below OHWM in Table A-1. Outfalls through a fishway to Stream KL-5 (Forbes Creek). In-water work is unavoidable at this site. A more detailed description of this retrofit is given near the end of section 7a and in Appendices A and C.
- Culvert 21 See Permit Plans, Sheets 11 and 12 and Photo Figures 29 and 30 in Appendix A. Extend culvert 30 feet eastward of the roadway. Install catch basins on both sides of the culvert. Outfalls to new piped conveyance system, which discharges to the new detention vault.

- Culvert 22 See Permit Plans, Sheet 12 and Photo Figures 31, 32 and 62 in Appendix A. Replace existing culvert with 292 feet of new culvert nearly perpendicular to the roadway. Wetland 19.3R will be a total loss due to road widening, and the construction of an ecology embankment and Retaining Wall 3020. Install catch basins on both sides of the culvert. The culvert will connect Stream C-22 to the existing conveyance system running south along the west side of the roadway. Inlet protection at the east end of the culvert will impact Stream C-22. These impacts are included in the permanent stream impacts below OHWM in Table A-1. Outfalls to new piped conveyance system discharging to Wetland 19.5L, which outfalls to Stream KL-8.
- Culvert 23 See Permit Plans, Sheet 13. Replace and upsize a segment of the existing culvert system to 24" diameter pipe. Wetland 19.6R and Jurisdictional Area C will be impacted due to road widening. Additional structures will be placed at the interchange to collect and convey off-site runoff to the new trunk line at 116<sup>th</sup>. Outfalls to existing piped conveyance system.
- Culvert 27 See Permit Plans, Sheet 18 and Photo Figures 33 and 34 in Appendix A. Extend culvert 20 feet eastward into the median. Jurisdictional Ditch 9 will be displaced due to road widening. A new ditch will be constructed to the east of the widened roadway. An ecology embankment will be constructed in the median along the eastern roadway embankment. Outfalls to existing detention pond.
- Culvert 28 See Permit Plans, Sheets 18 and 38, and Photo Figures 35, 36, 37, 38, 39, 40 and 44 in Appendix A. Extend culvert 30 feet eastward into the median. Reconstruct the outfall on the west side of the culvert. An ecology embankment will be constructed along the eastern roadway embankment. Stream C-28 runs through this culvert. Inlet protection at the east end of the culvert will impact Stream C-28, a tributary to Juanita Creek. These impacts are included in the permanent stream impacts below OHWM in Table A-1. Outfalls to a tributary to Stream KL-12, a tributary to Juanita Creek. In-water work is unavoidable at this site.
- Culvert 29 See Permit Plans, Sheets 19 and 39, and Photo Figures 42, 43, 45, 46, and 47 in Appendix A. Extend culvert 35 feet eastward into the median. Jurisdictional Ditch 12 will be displaced due to road widening. A new ditch will be constructed to the east of the widened roadway. An ecology embankment will be constructed along the eastern roadway embankment. Stream C-29 runs through this culvert. Inlet protection at the east end of the culvert will impact Stream C-29, a tributary to Juanita Creek. These impacts are included in the permanent stream impacts below OHWM in Table A-1. Outfalls to existing piped conveyance system which drains to Stream KL-12, a tributary to Juanita Creek.
- Culvert 30 See Permit Plans, Sheet 19 and Photo Figures 50, 51, and 52 in Appendix A. Jurisdictional Ditch 12 will be displaced due to road widening. The roadway will be widened on both sides; however the culvert currently extends further than the proposed roadway width. Flow patterns within this culvert will remain as is.

**Total Impacts associated with culvert work:**

4,261 sf permanent stream impacts below OHWM  
 15,096 sf permanent riparian impacts  
 832 sf temporary stream impacts below OHWM  
 31,525 sf temporary riparian impacts  
 2,526 sf (182 cy) fill below OHWM  
 2,005 sf (259 cy) excavation below OHWM

Impacts to streams are described in section 7C-1 and Appendix C.

Impacts to wetlands are accounted for in section 7C-2 and Appendix D. Wetland impacts are generally associated with road widening instead of with culvert work and are therefore discussed separately.

**Staging Areas, Equipment Access and Storage**

Staging areas will be located in unused, previously disturbed areas within the ROW. Staging areas will provide space for employee parking, large equipment storage, and material stockpiles. Construction staging will occur within areas of existing or newly-acquired right-of-way adjacent to the mainline; however, this does not mean that staging will not occur elsewhere. The contractor has the option and likely will find other locations for storage and staging. Likely staging areas are listed below. Management of these staging areas to avoid aquatic impacts, and impacts to all sensitive areas, is described further in 7c of this JARPA. "Infield area" refers to those vegetated areas within loops or off-ramps.

- Along the project limits, right-of-way is generally adequate to perform the work with typical machinery, including room for onsite staging
- Infield area of the southbound NE 70th Street on- and off-ramps (see Permit Plans, Sheet 6)
- Infield area of the northwest quadrant of the NE 85th Street loop ramp (see Permit Plans, Sheet 8)
- Triangular areas between the loop and stem ramp at the northwest, northeast, and southwest quadrants of the NE 85th Street interchange (see Permit Plans, Sheet 8)
- Infield area of the southbound NE 116th Street on-ramp (see Permit Plans, Sheets 13 and 14)

- Northbound and southbound along the mainline, between NE 116th Street and the BNSF bridges where extra-wide WSDOT right-of-way exists. The northbound side has a wetland area (Wetland 19.7R) near NE 116th Street, but the remaining workable area is greater than 1.5 acres. This site is also identified as a potential mitigation site. If this site is used for a mitigation site, staging will not be allowed at this location (see Permit Plans, Sheets 13 and 14).
- Infield areas of the southeast quadrant of the NE 124th Street interchange. Wetland 19.9R is within this quadrant; however, this wetland is a total loss because a detention pond will be constructed there (see Permit Plans, Sheet 15).
- Infield areas of the northwest, northeast, southwest, and southeast quadrants of the NE 160th Street interchange (see Permit Plans, Sheet 22).

#### Project Construction Schedule—Timing, Phasing, and Staging

The I-405, SR 520 to SR522 Project will be built in accordance with all applicable construction windows and limitations associated with permit conditions. Where in-water work is required, it will occur within the appropriate construction windows.

Construction is expected to take place in stages, with the entire project lasting up to six years beginning in 2005 and ending in 2011. It is likely that the I-405, SR520 to SR522 Project will be constructed in two stages. Stage 1, which is approximately 1.8 miles long, will provide immediate relief in Kirkland's worst congestion areas. WSDOT expects that the first stage of roadway construction, scheduled to begin in the latter half of 2005, will include the following major elements:

- Construction of new northbound and southbound lanes and shoulders of I-405 between NE 85<sup>th</sup> Street and NE 124<sup>th</sup> Street
- Reconstruction of the northbound off-ramp of the NE 116<sup>th</sup> Street interchange and minor modifications to the southbound on-ramp. If funding is available, reconstruction of the southbound on-ramp will be completed
- Construction of related stormwater management facilities and noise walls
- Fish passage retrofit at Forbes Creek
- Wetland mitigation

WSDOT anticipates that the second stage of the project, scheduled to begin in 2010, will be made up of the following roadway construction elements:

- Construction of the northbound lane and shoulder from the NE 70<sup>th</sup> Street interchange to the NE 85<sup>th</sup> Street interchange
- Construction of a new southbound lane and shoulder on I-405 from the SR 522 interchange to the NE 124<sup>th</sup> Street interchange
- Construction of a new southbound lane and shoulder from the NE 85<sup>th</sup> Street interchange to the add lane north of the SR 520 interchange
- Construction of related stormwater management facilities and noise walls
- Reconstruction of the NE 116<sup>th</sup> Street interchange and widening improvements to NE 116<sup>th</sup> Street

#### **Fish Passage at Forbes Creek**

Forbes Creek is a tributary to Lake Washington and flows through an existing 42-inch diameter 450 foot long vented CMP under I-405. The culvert was most likely installed during construction of I-405 during the 1950s and 1960s. The inlet entrance projects into the stream and has a rock headwall. The culvert discharges on to an aluminum apron and wingwall system. The downstream creek channel is located approximately 2 feet below the apron, which prevents adequate fish passage.

To correct this problem, a second culvert and a new fishway located at the downstream end of the culvert are proposed to be placed along the south side the existing culvert. The proposed project elements have been designed to meet Washington Department of Fish and Wildlife criteria provided in the 2003 *Design of Road Culverts for Fish Passage* and the 2000 *Fishway Guidelines for Washington State*.

The proposed culvert is anticipated to be a 78-inch diameter 450 foot long steel culvert with little slope. The proposed culvert upstream invert is approximately 3 feet lower than the existing upstream invert. The lower elevation accounts for the required 20% of the culvert diameter to be countersunk and ensure that low flows up to 18 cfs are conveyed to the new culvert. The existing culvert will be used in conjunction with the new culvert to convey flows higher than the high flow fish passage flow (18 cfs).

The fishway is composed of thirteen pools with an outlet and overflow pool. Each pool is approximately 8 feet in length by 8 feet in width with a minimum 3.4 foot water depth. The fishway is designed for a minimum fish passage flow of 0 cfs

and to pass 18 cfs over the entire 8 foot span of the weir with a head of 0.8 feet. High flows above 18 cfs will be passed over a 9 foot wide broad crested overflow weir located in the culvert outlet pool. A 6-foot high chain link fence around the fishway is also proposed.

This fish passage project is further described in Appendix A.

### Wetland Mitigation Projects

The following mitigation sites are part of the I-405, SR520 to SR522 project. These sites are listed in order of priority.

- Thrasher's Corner Site
- Forester/Van Alstyne Site
- Forbes Lake Park Site

The Conceptual Wetland Mitigation Discipline Report describes these sites in further detail.

**PREPARATION OF DRAWINGS:** SEE SAMPLE DRAWINGS AND GUIDANCE FOR COMPLETING THE DRAWINGS. **ONE SET OF ORIGINAL OR GOOD QUALITY REPRODUCIBLE DRAWINGS MUST BE ATTACHED.** NOTE: APPLICANTS ARE ENCOURAGED TO SUBMIT PHOTOGRAPHS OF THE PROJECT SITE, BUT THESE DO NOT SUBSTITUTE FOR DRAWINGS. **THE CORPS OF ENGINEERS AND COAST GUARD REQUIRE DRAWINGS ON 8-1/2 X 11 INCH SHEETS. LARGER DRAWINGS MAY BE REQUIRED BY OTHER AGENCIES.**

7b. DESCRIBE THE PURPOSE OF THE PROPOSED WORK AND WHY YOU WANT OR NEED TO PERFORM IT AT THE SITE. PLEASE EXPLAIN ANY SPECIFIC NEEDS THAT HAVE INFLUENCED THE DESIGN.

The purpose of the proposed action is to provide traffic congestion relief by implementing the roadway improvements described in this JARPA.

7c. DESCRIBE THE POTENTIAL IMPACTS TO CHARACTERISTIC USES OF THE WATER BODY. THESE USES MAY INCLUDE FISH AND AQUATIC LIFE, WATER QUALITY, WATER SUPPLY, RECREATION, and AESTHETICS. IDENTIFY PROPOSED ACTIONS TO AVOID, MINIMIZE, AND MITIGATE DETRIMENTAL IMPACTS, AND PROVIDE PROPER PROTECTION OF FISH AND AQUATIC LIFE. IDENTIFY WHICH GUIDANCE DOCUMENTS YOU HAVE USED. ATTACH A SEPARATE SHEET IF ADDITIONAL SPACE IS NEEDED.

The following Avoidance and Minimization measures will be used:

- Design elements incorporated into the project specifications, RFP, as well as construction plans and procedures, will avoid or minimize most potential construction impacts. Environmental compliance monitoring will be conducted to ensure that these design and construction measures are effective.
- Before construction, the contractor will place high-visibility fencing along no-touch portions of sensitive areas and around any vegetation area that WSDOT chooses to protect. The contractor will also show permit conditions on plan sheets.
- The contractor will assign an Environmental Compliance Manager trained in permitting requirements, water quality protection, wetland biology, and agency compliance procedures to project sites to ensure compliance with all permit conditions through construction completion and site stabilization. WSDOT will assign an Environmental Compliance Assurance Inspector. The contractor and WSDOT environmental personnel will monitor all TESCO activities. This will include monitoring receiving waters and in water work following WSDOT's Monitoring Protocol IL and Compliance Assurance IL as modified to meet project permit conditions.
- WSDOT and the contractor will implement the Environmental Compliance Assurance Procedure for Construction Projects and Activities, as described in Instructional Letter (IL) 4055.02, which is attached to this submittal package.
- The contractor will provide advance notification to WDFW and Ecology before any work in an environmentally sensitive area commences.
- WSDOT will develop and implement a commitment tracking system to identify all commitments made during planning, NEPA/SEPA, design, and permitting. All project commitments are to be clearly communicated to the contractor, who will, in turn, communicate commitments to project office staff and supporting design offices. All project commitments will be clearly communicated to the contractor in the RFP,
- The contractor will provide assurance that all environmental commitments have been achieved prior to the completion of construction and that WSDOT Maintenance and Operations have received and understand all long-term compliance expectations for the project site.

Several terms are used to identify impacts. The *cut/fill line* is established by the proposed roadway prism and drainage features. The *impact area line* is generally a ten foot parallel offset beyond the *cut/fill line*. This is intended to retain flexibility for the contractor to make design refinements. This *impact area line* is the boundary used to determine environmental mitigation. The contractor may adjust the *cut/fill line* outward to the *impact area line*, construct in this area, and be covered under permits. The *temporary impact line* is a ten foot parallel offset beyond the *impact area line*, which will exist only along the environmentally sensitive areas defined in the environmental discipline reports, such as streams, wetlands and their buffers. The area between the *impact area line* and the *temporary impact line* is considered a temporary impact area. The contractor may work in this area, but must restore the area to pre-project conditions. No permanent grading will be allowed within the temporary impact area.

Characteristic uses of the water bodies (i.e., streams and wetlands), temporary and permanent impacts to the water

bodies, and proposed actions to avoid, minimize, and compensate for unavoidable impacts are discussed below.

## 7C-1 STREAMS AND AQUATIC RESOURCES

There are 18 streams that cross or run parallel to I-405 within 300 feet of the project. These streams have been assigned numbers for study purposes; only four of the streams are named.

The impacted streams include:

Stream	Sheet No.	Characteristic Uses	Temporary Impacts (sf)	Permanent Impacts (sf)	Mitigation
C-5	3	None documented	3,400 riparian	7,140 (5,100 riparian; 2,040 below OHWM)	Restore vegetation to temporarily impacted area.
C-18	10	None documented	24 (16 riparian; 8 below OHWM)	12 below OHWM	Restore vegetation to temporarily impacted area.
C-19	10, 11	None documented	None	3,080 (3,000 riparian; 80 below OHWM)	None
KL-5 (Forbes Creek)	11, 16	Historically coho and cutthroat trout used Forbes Creek. Juvenile cutthroat documented upstream and downstream of I-405.	26,461 (26,013 riparian; 448 below OHWM)	8,601 (6,716 riparian; 1,885 below OHWM)	WSDOT proposes to retrofit to eliminate a fish passage barrier at Forbes Creek and that this action is self-mitigating.
C-22	12	None documented	112 (96 riparian; 16 below OHWM)	10 below OHWM	Restore vegetation to temporarily impacted area.
C-28	18	None documented. Tributary to Juanita Creek.	2,300 (2,000 riparian; 300 below OHWM)	400 (280 riparian; 120 below OHWM)	Restore vegetation to temporarily impacted area.
C-29	19	None documented. Tributary to Juanita Creek.	60 below OHWM	114 below OHWM	Restore vegetation to temporarily impacted area.

For a summary of impacts, please refer to the total impacts associated with culvert work in section 7a. Appendix A, Culverts, and Appendix C, Streams and Aquatic Resources describe stream impacts in more detail.

Please also refer to the Fish and Aquatic Resources Discipline Report and the Supplemental Stream Habitat Survey and Impact Assessment for the Fish and Aquatic Resources Discipline Report.

### Construction

#### In-water Work

In-water work will be subject to permit conditions, and performance standards to be included in the RFP. Performance standards will require the contractor to develop dewatering plans, construction staging, construction access, and construction sequencing plans that are protective of aquatic resources and sensitive habitats. These plans will include all grading in sensitive areas required for site access. In addition to this planning, the contractor will also be required to use BMPs to avoid or minimize impacts. The I-405 Team has used the cut/fill and impact lines on the permit plans to identify the extent of impacts the contractors are allowed.

For those culverts associated with streams and wetlands, the contractor will be required to perform culvert extensions in the dry season. During construction, the Forbes Creek crossing will be retrofitted to eliminate a fish passage barrier. Approximately 950 cubic yards of excavation will occur below the OHWM. This accounts for launch and retrieval pits, portions of the culvert, slopes and channel to be graded upstream and downstream of the culvert, structural fill for the fishway, and excavation associated with the wingwall.

Impact quantities are described in section 7a.

#### Avoidance and Minimization

The following avoidance and minimization measures will be used:

- Isolate work areas—All work areas will be isolated from the surrounding water bodies by a properly installed

erosion control fence or sediment sieve.

- Erosion from disturbed ground will be minimized using BMPs to keep water from the disturbed area, stabilize the disturbed ground, or minimize erosive forces of stormwater. In addition to these BMPs, filtering BMPs may also be used.
- The contractor will be subject to incentives and disincentives associated with compliance with permit conditions and water quality standards.
- Monitoring will occur under direction of the Contractor's Environmental Compliance Manager.
- WSDOT staff will also monitor construction activities.
- The Contractor will be required to store appropriate BMPs on-site to enable them to protect against erosion and turbidity during rain events.
- The Contractor will be subject to regulatory action for any incidents of non-compliance.
- A Spill Prevention, Control, and Countermeasures (SPCC) Plan will be developed and implemented by the contractor. The contractor will be responsible for revising the plan as necessary to conform to the actual operations and unanticipated activities as construction progresses.
- The Contractor will be required to identify concrete washout locations and avoid concrete associated impacts to all sensitive resources.
- Work timing windows will be established and implemented to minimize impacts to aquatic environments.
- A Temporary Erosion and Sediment Control (TESC) Plan will be developed and implemented for the project to prevent sediments from entering water bodies during construction.
- Staging/phasing by the contractor will not result in more than 10 acres of open ground at any one time without temporary or permanent erosion control in place.

### **Operation**

Existing baseline conditions for aquatic life along the project corridor are already severely degraded. The intent of the I-405, SR520 to SR522 project is to limit further degradation, and to improve baseline conditions by retrofitting existing infrastructure for better drainage and stormwater treatment.

The Forbes Creek fish passage retrofit will eliminate a fish passage barrier.

### **Mitigation Measures**

The proposed stormwater system north of the 160<sup>th</sup> interchange, adjacent to the southbound lanes, will address erosion and landslide hazard issues that currently threaten to impact stream KL14. Improvements associated with stormwater treatment for quality and quantity will indirectly benefit fisheries resources and the streams that support them.

## **7C-2 WETLANDS AND JURISDICTIONAL AREAS**

The I-405, SR520 to SR522 project will have the following wetland impacts:

0.191 acres temporary wetland impact (8,324 ft<sup>2</sup>)

1.599 acres permanent wetland impact (69,649 ft<sup>2</sup>)

0.018 acres indirect wetland impact (790 ft<sup>2</sup>)

0.409 acres temporary wetland buffer impact (17,811 ft<sup>2</sup>)

2.732 acres permanent wetland buffer impact (119,011 ft<sup>2</sup>)

Project biologists delineated 33 wetlands within the project area. Fourteen wetlands will be directly and permanently impacted. Wetland 19.9R will be indirectly impacted because its water source will be cut off. Portions of five wetlands will be temporarily impacted.

All of the wetlands have been previously disturbed to some extent by development, including construction of I-405 and development in the surrounding area. See Appendix D for a detailed wetland impact table. Complete descriptions of each wetland are included in the Wetland/Biology Report. Chapter 2.0 of the Conceptual Wetland Mitigation Discipline Report describes temporary, direct, and indirect wetland impacts.

### **Construction**

Permanent impacts to wetlands will occur as a result of filling to widen the road prism.

### Avoidance and Minimization

The design was refined in the following areas to minimize wetlands impacts:

- Wetland 21.6L – design refinements resulting in minimized impacts include: revised grading to reduce footprint area.
- Wetland 21.7L – design refinements resulting in minimized impacts include: revised grading to reduce footprint area.
- Wetland 22.5L – design refinements resulting in avoided and minimized impacts include: revised grading to reduce footprint area, and moving a proposed pond north to avoid impacts.

For a complete listing of all wetlands within the project limits and accounting of wetlands impacts, refer to the Wetlands Biology Report, Tables 4-1 and 4-2.

### Mitigation

Please refer to the Conceptual Wetland Mitigation Discipline Report for additional details.

### **Operation**

No operational impacts are anticipated.

### **Jurisdictional Areas**

Jurisdictional areas include jurisdictional ditches and other areas under U.S. Army Corps of Engineers (Corps) jurisdiction. There are 14 ditches and 4 areas under jurisdiction of the Corps (See Permit Plans, Sheets 2, 6, 11, 12, 13, 18, 19, 22 and 23 for jurisdictional ditches and Sheets 6, 9, 13 and 15 for jurisdictional areas). Jurisdictional ditches provide water quality treatment and convey roadway drainage to other water quality treatment facilities, streams, and/or wetlands. Jurisdictional areas have wetland characteristics, but appear to have been intentionally constructed in uplands and are not associated with a natural drainage system. The area of impact to jurisdictional ditches and areas from the road improvements calculated as length times width, is as follows:

Ditch 1	167 ft <sup>2</sup>	(Permit Plans, Sheet 2)
Ditch 2	167 ft <sup>2</sup>	(Permit Plans, Sheet 2)
Ditch 3	100 ft <sup>2</sup>	(Permit Plans, Sheet 6)
Ditch 4	100 ft <sup>2</sup>	(Permit Plans, Sheets 11 and 12)
Ditch 5	225 ft <sup>2</sup>	(Permit Plans, Sheet 12)
Ditch 6	600 ft <sup>2</sup>	(Permit Plans, Sheet 12)
Ditch 7	100 ft <sup>2</sup>	(Permit Plans, Sheet 12 and 13)
Ditch 8	67 ft <sup>2</sup>	(Permit Plans, Sheet 12 and 13)
Ditch 9	1,000 ft <sup>2</sup>	(Permit Plans, Sheet 18)
Ditch 10	34 ft <sup>2</sup>	(Permit Plans, Sheet 18)
Ditch 11	0 ft <sup>2</sup>	Jurisdictional Ditch 11 is no longer impacted because the southbound lanes will be widened to the median (Permit Plans, Sheet 19).
Ditch 12	2,100 ft <sup>2</sup>	(Permit Plans, Sheet 19)
Ditch 13	200 ft <sup>2</sup>	(Permit Plans, Sheet 22)
Ditch 14	0 ft <sup>2</sup>	Wetland 22.8L has been re-delineated and now covers what used to be called Jurisdictional Ditch 14. This is now treated as wetland, not jurisdictional ditch (Permit Plans, Sheet 23).
<hr/>		
Total	4,860 ft <sup>2</sup>	
<hr/>		
Area A	725 ft <sup>2</sup>	(Permit Plans, Sheet 6)
Area B	506 ft <sup>2</sup>	(Permit Plans, Sheet 9)
Area C	3,380 ft <sup>2</sup>	(Permit Plans, Sheet 13)
Area D	0 ft <sup>2</sup>	Jurisdictional Area D will be impacted and mitigated as part of the Sound Transit Direct Access 128 <sup>th</sup> Street Project (Permit Plans, Sheet 15).
<hr/>		
Total	4,611 ft <sup>2</sup>	

The Project is self-mitigating for these impacts because new ditches will either be added along the sides of the widened highway, and/or ecology embankments will be installed to provide the same water quality treatment and stormwater conveyance functions.

### **7C-3 WATER QUALITY**

#### **Construction**

Impacts to water quality could occur as a result of the following activities:

- *Clearing and grading*
- *Staging and storing equipment*
- *Dewatering Work*
- *In-water work*

Dewatering of groundwater is anticipated for the following items:

- Construction and operation of the jacking and receiving pits for the Forbes Creek Fish Passage Culvert
- Replacement of culverts 1 and 22 if jacking is used for installation
- Construction of the 116<sup>th</sup> Bridge piling/pier during construction
- Installation of the pre-cast stormwater vaults at MP 19.4
- Localized storm drain installations at the 116<sup>th</sup> interchange
- Construction of other outfalls and control structures

#### Avoidance and Minimization

The following avoidance and minimization measures will be used:

- The contractor will be required to develop and implement a TESC Plan, and a SPCC Plan for all construction activities.
- The contractor will be required to develop a contingency plan before in-water construction activities begin so that they are ready to adequately respond to storm events. This contingency plan will include specific methods and actions to avoid or minimize impacts to aquatic resources.
- The contractor will be required to develop and implement a SWPPP specifically for construction activities associated with aquatic resources.
- Dewatering flows will be treated as required to meet water quality standards. Water quality treatment will include using sedimentation ponds and tanks, and filtering BMPs. Construction wash water will also be required to have treatment.

The TESC Plan, the SPCC Plan, and the SWPPP will address the following:

#### *TESC Plan and SWPPP*

- Location and type of erosion and sedimentation control measures.
- Site stabilization requirements
- Location and type of control measures for other pollutants besides sedimentation
- Treatment of construction runoff
- Inspection monitoring plan
- Water quality monitoring plan
- Concrete process water plan
- Source control BMPs
- Monitoring and Compliance Reporting Plan submitted to WSDOT and appropriate regulatory agencies

#### *SPCC Plan and SWPPP*

- Procedures for refueling and storage of chemicals
- Measures to take in the event of a spill
- Worker training requirements.
- Contingency plans in case of accidental, construction-related spills.

### **Operation**

The Project would add about 13.56 acres of impervious surfaces along the project corridor. This change represents approximately a 5 percent increase in impervious area compared to the existing impervious area, and less than a 1 percent increase in total impervious area within the project area sub-basins.

### Mitigation Measures

#### *Water Quality Treatment Facilities*

In addition to providing enhanced water quality treatment, oil and other petroleum products will be removed with oil treatment BMPs.

## **7C-4 SURFACE WATER AND FLOODPLAINS**

### **Construction**

Construction of the I-405, SR520 to SR522 Project will not have an adverse effect on water quantity or flooding in Lake Washington, Yarrow Creek, Forbes Creek, Juanita Creek, Totem Lake, the Sammamish River, or other receiving waters.

Work within Forbes Creek will occur below the OHWM. This work will be accomplished in compliance with WAC 173-201 (Surface Water Quality), Chapter 77.55 RCW (Construction in State Waters), WAC 220.110, (Hydraulic Code Rules), and other applicable standards. Monitoring and BMPs will be used to keep activities compliant with the current WSDOT and Ecology WQIA, and state and federal water quality regulations that apply. Monitoring reports will be sent to regulatory agencies monthly. The design and BMPs used for construction activities will be determined as part of the design process that WSDOT is currently working on with WDFW and other MAP Team agencies concurrent with permitting. Refer also to the Implementing Agreement between WSDOT and Ecology regarding compliance with the State of Washington surface water quality standards.

The Project will be designed and constructed in compliance with WSDOT technical guidance and federal, state, and local regulations and permits to protect water quality and fish life. The selected design-builder will be required to prepare a TESC Plan prior to initiating construction of the Build Alternative. These plans will identify BMPs approved in the WSDOT HRM to prevent soil erosion and surface water pollution occurring during construction.

The Environmental Compliance Manager will be responsible for inspecting the project area for potential or imminent surface water and floodplains violations, adapting the project to address the violations and for reporting the occurrences to WSDOT and the applicable resource agencies.

### **Operation**

#### *Stormwater*

The I-405, SR520 to SR522 Project will increase the amount of impervious surface area, increase stormwater runoff volume and flow rates. The expanded transportation facilities will also generate increased pollutant loadings. However, as part of the project, stormwater runoff will be treated and detained using BMPs in the WSDOT HRM to control both quantity and quality of the highway runoff.

The proposed project isolates stormwater runoff from the project's new impervious surfaces and portions of the replaced pavement from off-site and/or municipal stormwater systems until the runoff is treated. Enhanced water quality treatment technologies will be used to reduce highway runoff pollutant loadings to levels that will not affect downstream aquatic resources. Enhanced treatment provides a higher level of treatment than basic treatment BMPs (which remove total suspended solids) by also removing copper and zinc. Typical enhanced treatment BMPs include: ecology embankments; constructed stormwater treatment wetlands; and two-cell ponds.

Appendix B contains more information regarding stormwater. Please also refer to both the Surface Water and Floodplains Discipline Report, and the Preliminary Hydraulic Report for more information.

#### *Floodplains*

The I-405, SR520 to SR522 Project does not physically encroach on any existing floodplain areas and maintains existing floodplain storage capacities. The Project also provides detention for runoff generated by new and replaced pavement areas for storm events up through the 50-year storm. For storms larger than the 50-year event, runoff volumes generated by the Project are likely to be the same as, or slightly larger than would be expected to occur under existing

conditions.

#### Mitigation Measures

Highway stormwater runoff from the project area will be controlled and treated in accordance with the WSDOT HRM 2004 and other applicable regulations that would apply. Stormwater runoff from the highway will be detained and released slowly, keeping flow rates at levels similar to natural conditions. Stormwater surface discharges will match the range of pre-developed discharge rates from 50 percent of the 2-year peak flow, up to the full 50-year peak flow.

In each situation where there is the potential for flooding to occur in floodplains identified on FEMA maps, the project will be designed to minimize flooding conditions. These floodplains are located downstream of the outfalls on the I-405, SR520 to SR522 Project.

#### **7C-5 MANAGEMENT OF STAGING AREAS**

- The contractor will be required to identify all staging areas to the Environmental Compliance Manager prior to using that area.
- The Environmental Compliance Manager will be required to mark sensitive areas with high-visibility fencing, and install BMPs as needed to protect the sensitive areas.
- The contractor will be required to notify permit agencies if they are placing staging areas within a pre-determined distance as negotiated with the permit agencies.
- No contractor staging area will be allowed within 90 meters (300 feet) of any wetland, stream, or river with listed species.
- Project contractors will confine construction projects to the minimum necessary to complete the project.
- To the extent feasible impacts to vegetated areas will be minimized. Any vegetated areas that might be used for staging will be previously disturbed urban sites in proximity to the project.
- Staging areas will occur in areas already impervious or disturbed. No mature native trees and plants will be removed for staging areas. Any area where immature or non-native vegetation will be removed to accommodate staging will be re-vegetated with native vegetation upon completion of the project.

#### **7C-6 GROUNDWATER**

Please see Appendix E, Groundwater, for information.

7d. FOR IN WATER CONSTRUCTION WORK, WILL YOUR PROJECT BE IN COMPLIANCE WITH THE STATE OF WASHINGTON WATER QUALITY STANDARDS FOR TURBIDITY WAC 173.201A-110? ☒ YES ☐ NO (SEE USEFUL DEFINITIONS AND INSTRUCTIONS)

8. WILL THE PROJECT BE CONSTRUCTED IN STAGES? ☒ YES ☐ NO

PROPOSED STARTING DATE: **Fall 2005**

ESTIMATED DURATION OF ACTIVITY: **2005-2011**

9. CHECK IF ANY TEMPORARY OR PERMANENT STRUCTURES WILL BE PLACED:

☒ WATERWARD OF THE ORDINARY HIGH WATER MARK OR LINE FOR FRESH OR TIDAL WATERS; AND/OR

**Structures will include a fish passage facility at Forbes Creek, headwalls, and several culvert-extensions.**

☐ WATERWARD OF MEAN HIGHER HIGH WATER LINE IN TIDAL WATERS

10. WILL FILL MATERIAL (ROCK, FILL, BULKHEAD, OR OTHER MATERIAL) BE PLACED:

☒ WATERWARD OF THE ORDINARY HIGH WATER MARK OR LINE FOR FRESH WATERS?

IF YES, VOLUME (CUBIC YARDS) 182 / AREA 0.058 (ACRES)

☐ WATERWARD OF THE MEAN HIGHER HIGH WATER FOR TIDAL WATERS?

IF YES, VOLUME (CUBIC YARDS) \_\_\_\_\_ AREA \_\_\_\_\_ (ACRES)

11. WILL MATERIAL BE PLACED IN WETLANDS? <span style="float: right;"><input checked="" type="checkbox"/> YES <input type="checkbox"/> NO</span> IF YES:					
A. IMPACTED AREA IN ACRES: <b>1.599 ac direct impact</b>					
B. HAS A DELINEATION BEEN COMPLETED? IF YES, PLEASE SUBMIT WITH APPLICATION. <span style="float: right;"><input checked="" type="checkbox"/> YES <input type="checkbox"/> NO</span>					
C. HAS A WETLAND REPORT BEEN PREPARED? IF YES, PLEASE SUBMIT WITH APPLICATION. <span style="float: right;"><input checked="" type="checkbox"/> YES <input type="checkbox"/> NO</span>					
D. TYPE AND COMPOSITION OF FILL MATERIAL (E.G., SAND, ETC.): <b>Road fill material</b>					
E. MATERIAL SOURCE: <b>To be identified by the contractor</b>					
F. LIST ALL SOIL SERIES (TYPE OF SOIL) LOCATED AT THE PROJECT SITE, & INDICATE IF THEY ARE ON THE COUNTY'S LIST OF HYDRIC SOILS. SOILS INFORMATION CAN BE OBTAINED FROM THE NATURAL RESOURCES CONSERVATION SERVICE (NRCS): <b>To be classified by the contractor during final design</b>					
G. WILL PROPOSED ACTIVITY CAUSE FLOODING OR DRAINING OF WETLANDS? <span style="float: right;"><input checked="" type="checkbox"/> YES <input type="checkbox"/> NO</span>					
IF YES, IMPACTED AREA IS <b>0.018</b> ACRES OF DRAINED WETLANDS ( <b>Wetland 19.9R</b> ).					
NOTE: If your project will impact greater than 1/2 of an acre of wetland, submit a mitigation plan to the Corps and Ecology for approval along with the JARPA form NOTE: a 401 water quality certification will be required from Ecology in addition to an approved mitigation plan if your project impacts wetlands that are: a) greater than 1/2 acre in size, or b) tidal wetlands or wetlands adjacent to tidal water. Please submit the JARPA form and mitigation plan to Ecology for an individual 401 certification if a) or b) applies.					
12. STORMWATER COMPLIANCE FOR NATIONWIDE PERMITS ONLY: THIS PROJECT IS (OR WILL BE) DESIGNED TO MEET ECOLOGY'S MOST CURRENT STORMWATER MANUAL, OR AN ECOLOGY APPROVED LOCAL STORMWATER MANUAL <span style="float: right;"><input checked="" type="checkbox"/> YES <input type="checkbox"/> NO</span>					
IF YES – WHICH MANUAL WILL YOUR PROJECT BE DESIGNED TO MEET <p style="text-align: center;"><b>WSDOT Highway Runoff Manual M 31-16, March 2004</b></p>					
IF NO – FOR CLEAN WATER ACT SECTION 401 AND 404 PERMITS ONLY – PLEASE SUBMIT TO ECOLOGY FOR APPROVAL, ALONG WITH THIS JARPA APPLICATION, DOCUMENTATION THAT DEMONSTRATES THE STORMWATER RUNOFF FROM YOUR PROJECT OR ACTIVITY WILL COMPLY WITH THE WATER QUALITY STANDARDS, WAC 173.201(A)					
13. WILL EXCAVATION OR DREDGING BE REQUIRED IN WATER OR WETLANDS? <span style="float: right;"><input checked="" type="checkbox"/> YES <input type="checkbox"/> NO</span> IF YES:					
A. VOLUME: <b>259 (below OHWM of streams) &amp; 0 (wetlands)</b> (CUBIC YARDS) / AREA <b>0.046 (below OHWM of streams) &amp; 0 (wetlands)</b> (ACRES) Volume is based on excavation below OHWM, area is based on excavation totals from culvert work below OHWM and wetland impacts.					
B. COMPOSITION OF MATERIAL TO BE REMOVED: <b>Native soil removed from streams</b>					
C. DISPOSAL SITE FOR EXCAVATED MATERIAL: <b>To be determined by the Contractor</b>					
D. METHOD OF DREDGING: <b>To be determined by the Contractor</b>					
Note: The Final Wetland Mitigation Plan may also identify excavation or dredging within streams or wetlands.					
14. HAS THE STATE ENVIRONMENTAL POLICY ACT (SEPA) BEEN COMPLETED? <span style="float: right;"><input type="checkbox"/> YES <input checked="" type="checkbox"/> NO</span> SEPA LEAD AGENCY: <b>WSDOT</b> SEPA DECISION: DNS, <b>MDNS</b> , EIS, ADOPTION, EXEMPTION DECISION DATE (END OF COMMENT PERIOD): <b>3/08/05</b> SUBMIT A COPY OF YOUR SEPA DECISION LETTER TO WDFW AS REQUIRED FOR A COMPLETE APPLICATION <b>The SEPA Decision letter is not yet available.</b>					
15. LIST OTHER APPLICATIONS, APPROVALS, OR CERTIFICATIONS FROM OTHER FEDERAL, STATE OR LOCAL AGENCIES FOR ANY STRUCTURES, CONSTRUCTION, DISCHARGES, OR OTHER ACTIVITIES DESCRIBED IN THE APPLICATION (I.E., PRELIMINARY PLAT APPROVAL, HEALTH DISTRICT APPROVAL, BUILDING PERMIT, SEPA REVIEW, FEDERAL ENERGY REGULATORY COMMISSION LICENSE (FERC), FOREST PRACTICES APPLICATION, ETC.) ALSO INDICATE WHETHER WORK HAS BEEN COMPLETED AND INDICATE ALL EXISTING WORK ON DRAWINGS. NOTE: FOR USE WITH CORPS NATIONWIDE PERMITS, IDENTIFY WHETHER YOUR PROJECT HAS OR WILL NEED AN NPDES PERMIT FOR DISCHARGING WASTEWATER AND/OR STORMWATER.					
TYPE OF APPROVAL	ISSUING AGENCY	IDENTIFICATION NO.	DATE OF APPLICATION	DATE APPROVED	COMPLETED?
Clearing and Grading Permit	King County				
402 NPDES	Ecology				
Air Quality Conformity	PSCAA				
CZMA Consistency Determination	Ecology				
Grading and Critical Area	King County				
Grading and Critical Area	City of Bothell				
ESA Section 7 Consultation	NOAA Fisheries	00886	August 9, 2004	October 28, 2004	Yes
ESA Section 7 Consultation	USFWS		August 9, 2004	October 25, 2004	Yes
Section 106	OAHP				


16. HAS ANY AGENCY DENIED APPROVAL FOR THE ACTIVITY YOU'RE APPLYING FOR OR FOR ANY ACTIVITY DIRECTLY RELATED TO THE ACTIVITY DESCRIBED HEREIN? ☐ YES ☒ NO IF YES, EXPLAIN:

**SECTION B - Use for Shoreline and Corps of Engineers permits only:**

17a. TOTAL COST OF PROJECT. THIS MEANS THE FAIR MARKET VALUE OF THE PROJECT, INCLUDING MATERIALS, LABOR, MACHINE RENTALS, ETC.

**\$164,000,000 (Cost includes planning and design work)**

17b. IF A PROJECT OR ANY PORTION OF A PROJECT RECEIVES FUNDING FROM A FEDERAL AGENCY, THAT AGENCY IS RESPONSIBLE FOR ESA CONSULTATION. PLEASE INDICATE IF YOU WILL RECEIVE FEDERAL FUNDS AND WHAT FEDERAL AGENCY IS PROVIDING THOSE FUNDS. SEE INSTRUCTIONS FOR INFORMATION ON ESA\*\*

FEDERAL FUNDING ☐ YES ☒ NO IF YES, PLEASE LIST THE FEDERAL AGENCY

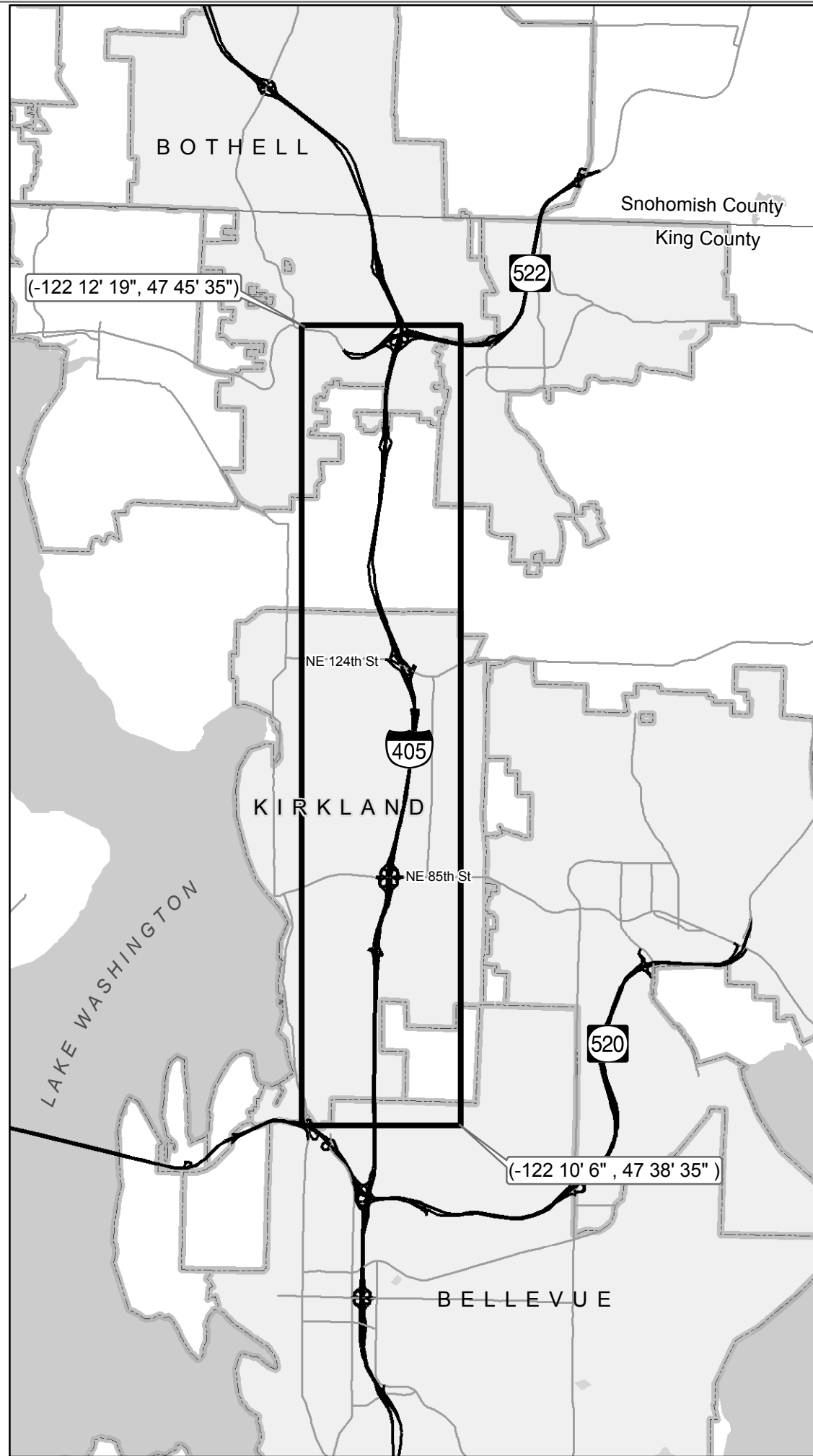
18. LOCAL GOVERNMENT WITH JURISDICTION:

**City of Kirkland, City of Bothell, King County**

19. FOR CORPS, COAST GUARD, AND DNR PERMITS, PROVIDE NAMES, ADDRESSES, AND TELEPHONE NUMBERS OF ADJOINING PROPERTY OWNERS, LESSEES, ETC...

*PLEASE NOTE: SHORELINE MANAGEMENT COMPLIANCE MAY REQUIRE ADDITIONAL NOTICE — CONSULT YOUR LOCAL GOVERNMENT.*

NAME	ADDRESS	PHONE NUMBER



## Plan View

Sheets 2 to 25

## Sections

Sheets 26 to 45

## Typical Details

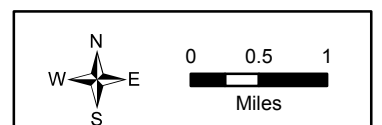
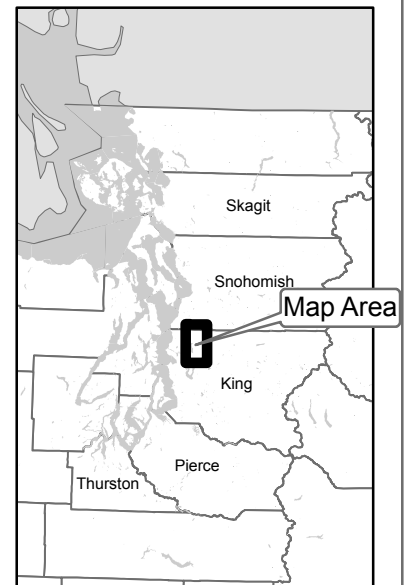
Sheets 46 to 48

## Forbes Creek Details

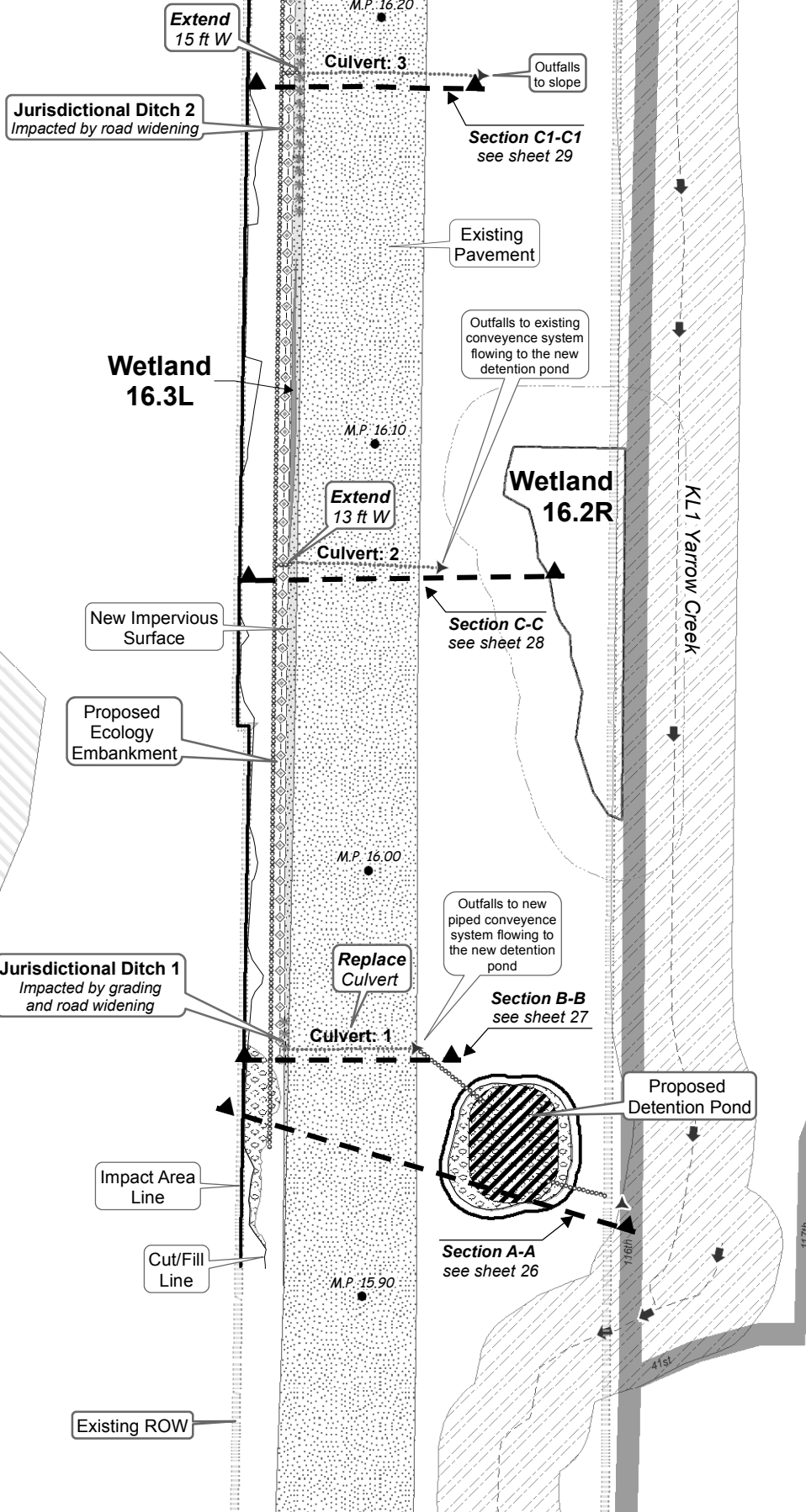
Sheets 49 to 53

## Legend

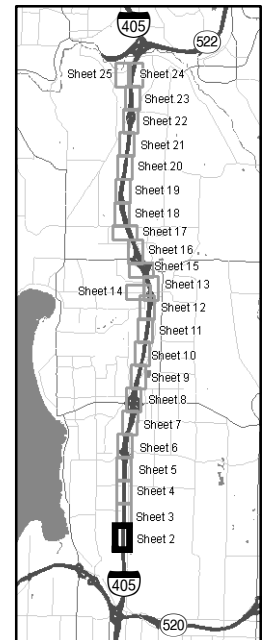
- Arterial Road
- Freeway
- Municipality
- Permit Area
- Lake



Source: WSDOT, 2004. King County, 2004. ISEAW405405gisprojectmap\_docs\Kirkland\Permitting\Kirkland\_permit\_plan\_maps.mxd | Last Updated: 02-08-05



- Legend**
- ▲ Proposed Outfalls
  - Milepost
  - ∧ Cut & Fill
  - ➔ Stream
  - Road
  - ➔ Railroad
  - High Water Mark
  - Cross Section
  - Impact & Temporary Impact Line
  - ||||| Proposed ROW
  - ||||| Existing ROW
  - Proposed Drainage
  - Existing Drainage
  - Retaining Wall
  - Proposed Noise Wall
  - \*\*\* Jurisdictional Ditch
  - ◇◇ Proposed Ecology Embankment
  - Bridge
  - ▨ Proposed Stormwater Facility
  - ▨ Existing Stormwater Facility
  - ▨ Jurisdictional Area
  - ▨ Direct Impact Wetland
  - ▨ Temporary Impact Wetland
  - ▨ No Impact Wetland
  - ▨ Direct Impact Wetland Buffer
  - ▨ Temporary Impact Wetland Buffer
  - ▨ Indirect Impact Wetland Buffer
  - ▨ No Impact Wetland Buffer
  - ▨ New Impervious Surface
  - ▨ Remove Pavement
  - ▨ Existing Pavement
  - ▨ 100Yr Floodplain
  - ▨ Landslide Hazard
  - ▨ Erosion Hazard
  - ▨ Stream Impact Buffer
  - ▨ Vegetation Impact Area
  - ▨ Municipality Boundary



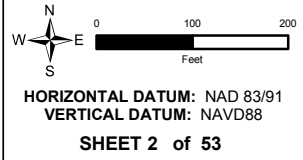
WETLAND IMPACTS (sf)			
Wetland	Temporary	Direct	Indirect
16.3L	0	1360	0

**I-405, SR520 to SR522**

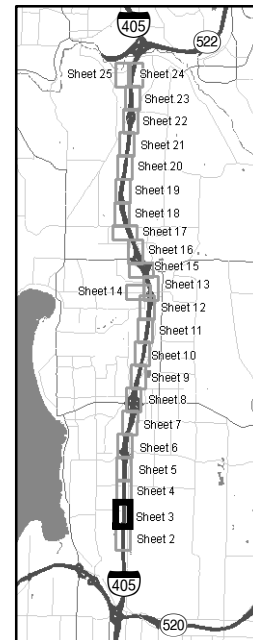
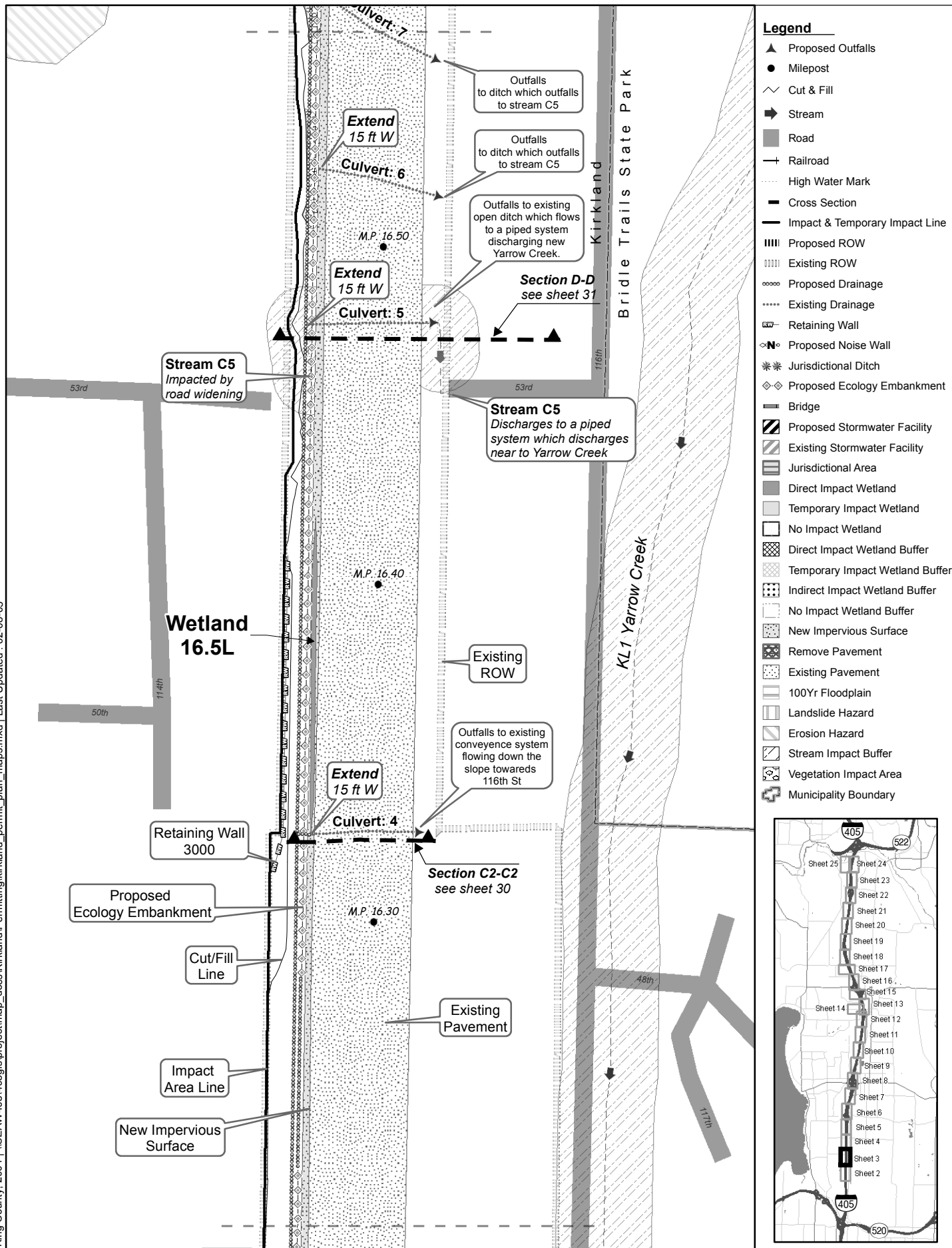
REFERENCE:  
**200401410**

APPLICANT: WSDOT

**PURPOSE:** Roadway Improvements  
**PROPOSED/RETAIN:** Fill 1.657 acres of wetlands and other waters of the U.S.  
**IN:** Streams and Wetlands  
**AT:** Kirkland  
**COUNTY:** King **STATE:** WA  
**DATE:** 02/03/2005



Source: WSDOT, 2004. King County, 2004. | \\SEAW405\gis\project\map\_docs\Kirkland\Permitting\Kirkland\_permit\_plan\_maps.mxd | Last Updated : 02-08-05



WETLAND IMPACTS (sf)			
Wetland	Temporary	Direct	Indirect
16.5L	0	2802	0

**I-405, SR520 to SR522**

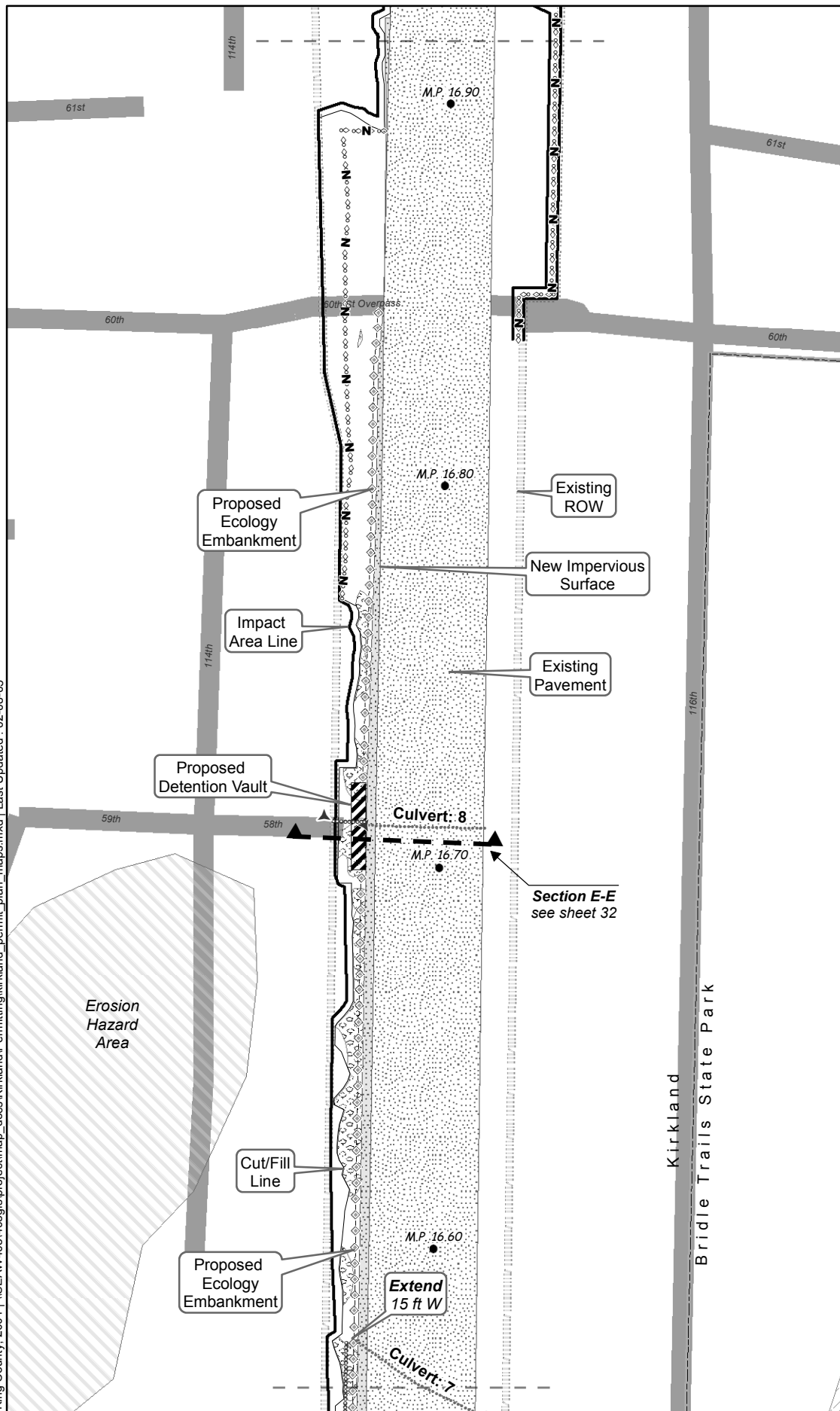
REFERENCE:  
**200401410**

APPLICANT: WSDOT

**PURPOSE:** Roadway Improvements  
**PROPOSED/RETAIN:** Fill 1.657 acres of wetlands and other waters of the U.S.  
**IN:** Streams and Wetlands  
**AT:** Kirkland  
**COUNTY:** King **STATE:** WA  
**DATE:** 02/03/2005

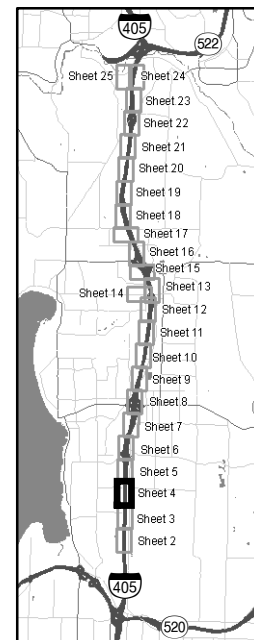
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**VERTICAL DATUM:** NAVD88  
**SHEET 3 of 53**

Source: WSDOT, 2004. King County, 2004. | \\SEAW405\gis\project\map\_docs\Kirkland\Permitting\Kirkland\_permit\_plan\_maps.mxd | Last Updated : 02-08-05



### Legend

- ▲ Proposed Outfalls
- Milepost
- ∧ Cut & Fill
- ➡ Stream
- ▬ Road
- ➡ Railroad
- ⋯ High Water Mark
- Cross Section
- Impact & Temporary Impact Line
- ||||| Proposed ROW
- ||||| Existing ROW
- ⋯ Proposed Drainage
- ⋯ Existing Drainage
- ▬ Retaining Wall
- ⋯ Proposed Noise Wall
- \*\*\* Jurisdictional Ditch
- ◆ Proposed Ecology Embankment
- ▬ Bridge
- ▨ Proposed Stormwater Facility
- ▨ Existing Stormwater Facility
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- ▨ 100Yr Floodplain
- ▨ Landslide Hazard
- ▨ Erosion Hazard
- ▨ Stream Impact Buffer
- ▨ Vegetation Impact Area
- ▨ Municipality Boundary



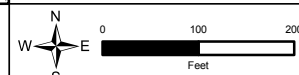
**NO WETLAND IMPACTS**

**I-405, SR520 to SR522**

REFERENCE:  
**200401410**

APPLICANT: WSDOT

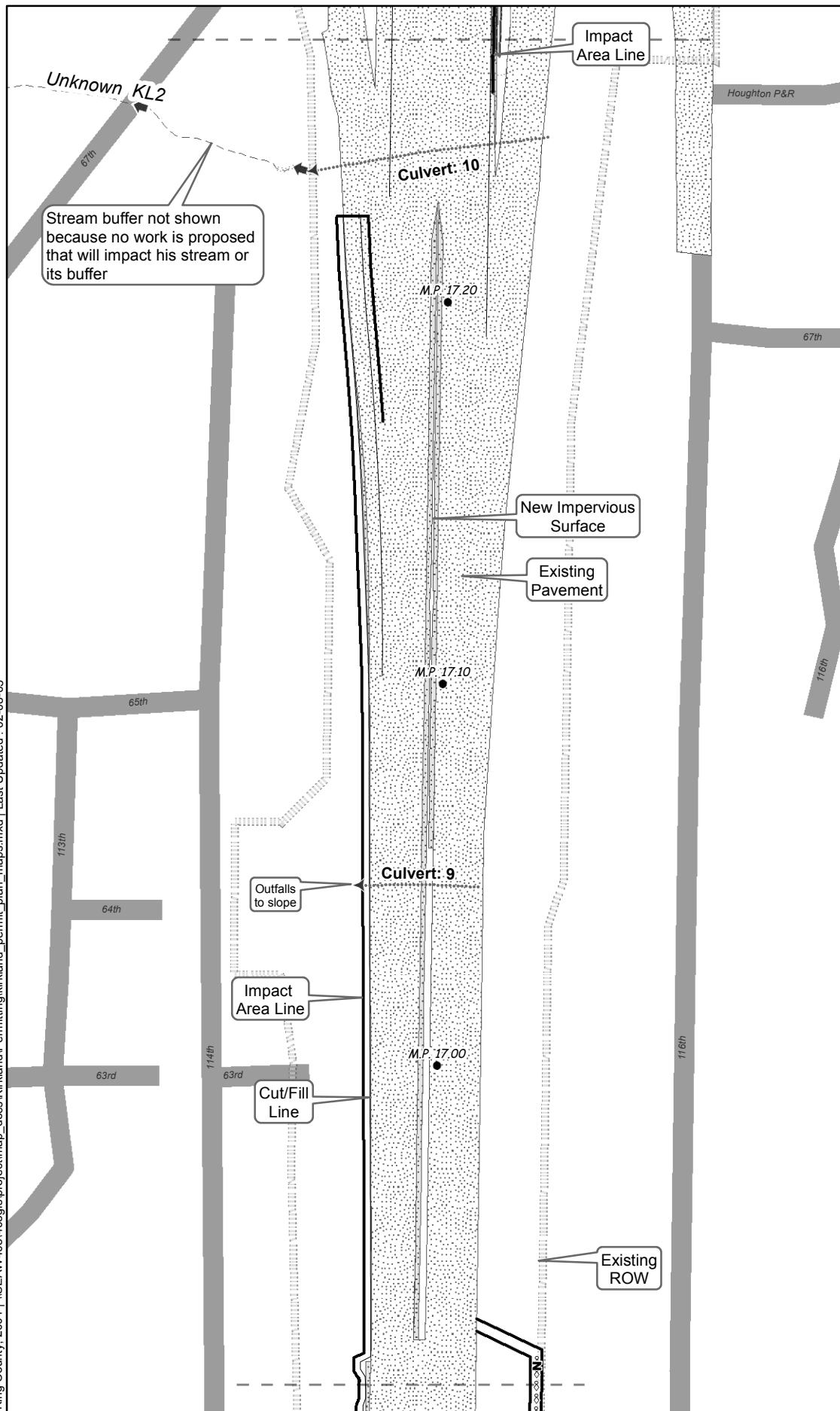
**PURPOSE:** Roadway Improvements  
**PROPOSED/RETAIN:** Fill 1.657 acres of wetlands and other waters of the U.S.  
**IN:** Streams and Wetlands  
**AT:** Kirkland  
**COUNTY:** King **STATE:** WA  
**DATE:** 02/03/2005



**HORIZONTAL DATUM:** NAD 83/91  
**VERTICAL DATUM:** NAVD88

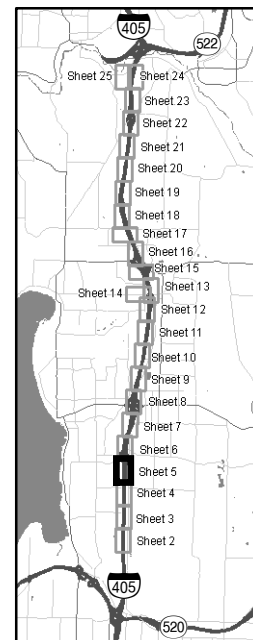
**SHEET 4 of 53**

Source: WSDOT, 2004. King County, 2004. | \\SEAW405\gis\project\map\_docs\Kirkland\Permitting\Kirkland\_permit\_plan\_maps.mxd | Last Updated : 02-08-05



#### Legend

- ▲ Proposed Outfalls
- Milepost
- ∧ Cut & Fill
- ➡ Stream
- Road
- ➡ Railroad
- ⋯ High Water Mark
- Cross Section
- Impact & Temporary Impact Line
- ||||| Proposed ROW
- ||||| Existing ROW
- ⋯ Proposed Drainage
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- ▨ Landslide Hazard
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- ⬢ Municipality Boundary



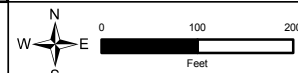
**NO WETLAND IMPACTS**

**I-405, SR520 to SR522**

REFERENCE:  
**200401410**

APPLICANT: WSDOT

**PURPOSE:** Roadway Improvements  
**PROPOSED/RETAIN:** Fill 1.657 acres of wetlands and other waters of the U.S.  
**IN:** Streams and Wetlands  
**AT:** Kirkland  
**COUNTY:** King **STATE:** WA  
**DATE:** 02/03/2005

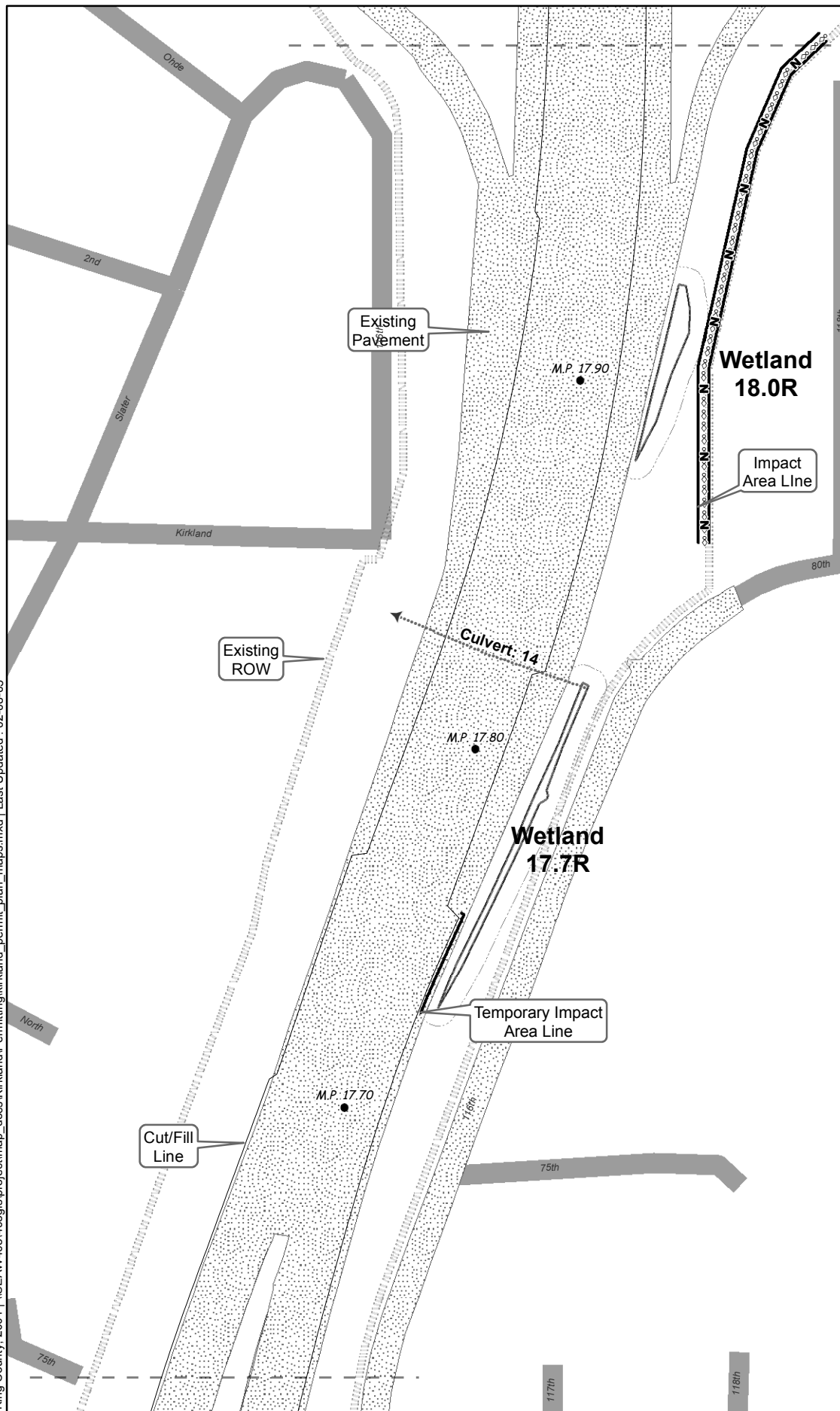


**HORIZONTAL DATUM:** NAD 83/91  
**VERTICAL DATUM:** NAVD88

**SHEET 5 of 53**

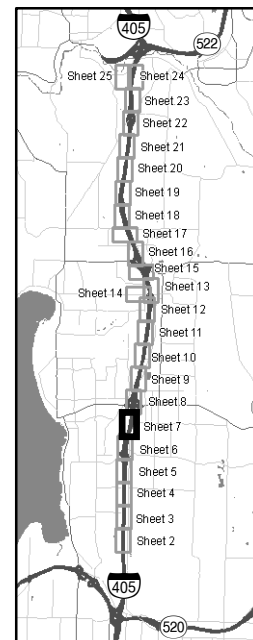


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#### Legend

- ▲ Proposed Outfalls
- Milepost
- ∧ Cut & Fill
- ➡ Stream
- Road
- +— Railroad
- High Water Mark
- Cross Section
- Impact & Temporary Impact Line
- ||||| Proposed ROW
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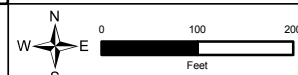
**NO WETLAND IMPACTS**

**I-405, SR520 to SR522**

REFERENCE:  
**200401410**

APPLICANT: WSDOT

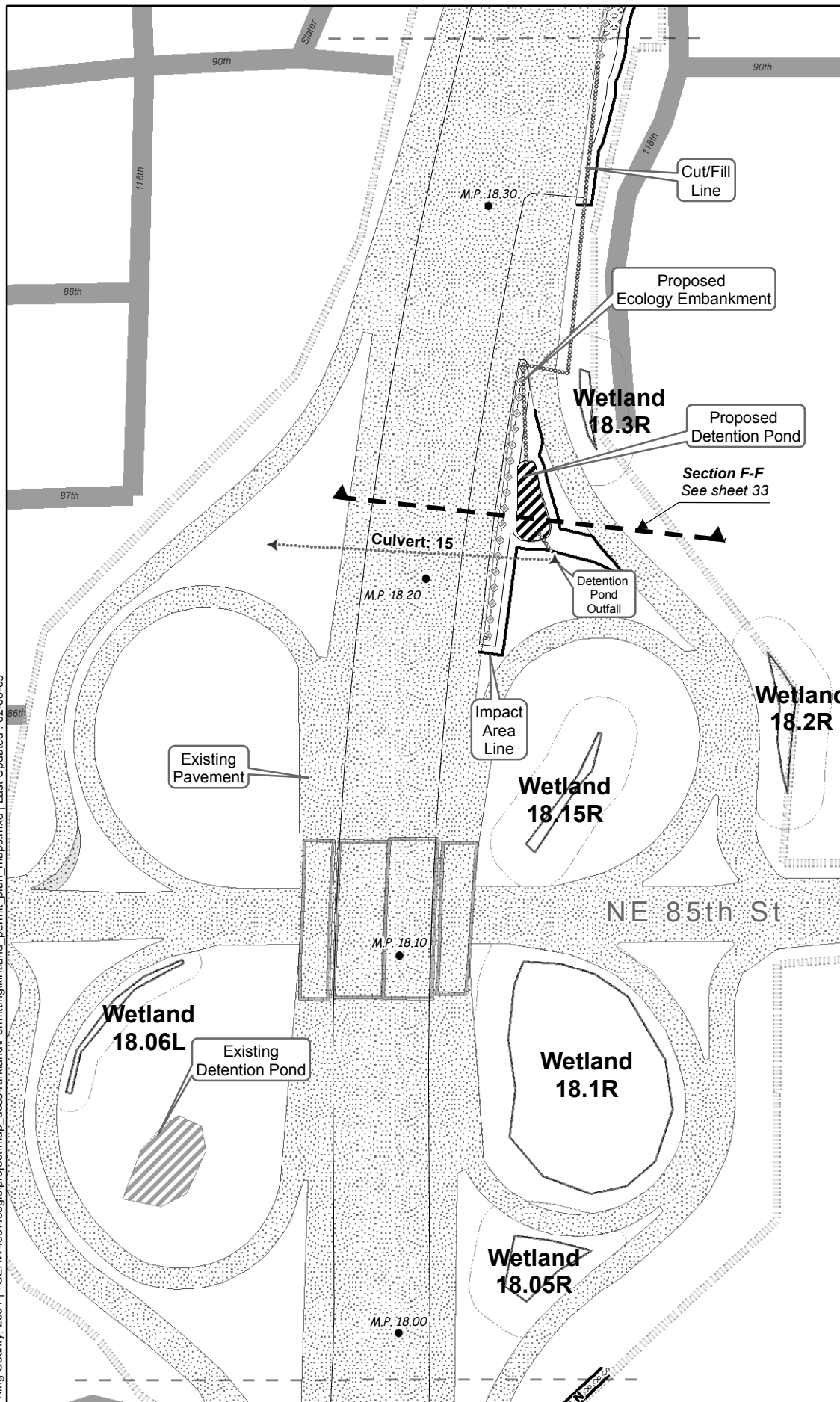
**PURPOSE:** Roadway Improvements  
**PROPOSED/RETAIN:** Fill 1.657 acres of wetlands and other waters of the U.S.  
**IN:** Streams and Wetlands  
**AT:** Kirkland  
**COUNTY:** King **STATE:** WA  
**DATE:** 02/03/2005



**HORIZONTAL DATUM:** NAD 83/91  
**VERTICAL DATUM:** NAVD88

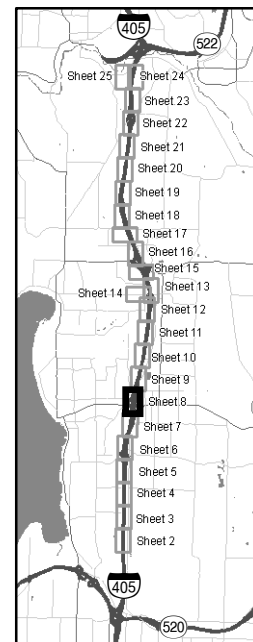
**SHEET 7 of 53**

Source: WSDOT, 2004. King County, 2004 | I:\SEAW\405\405gis\project\map\_docs\Kirkland\Permitting\Kirkland\_permit\_plan\_maps.mxd | Last Updated : 02-08-05



#### Legend

- ▲ Proposed Outfalls
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- ▨ Vegetation Impact Area
- ⬢ Municipality Boundary



**NO WETLAND IMPACTS**

**I-405, SR520 to SR522**

REFERENCE:  
**200401410**

APPLICANT: WSDOT

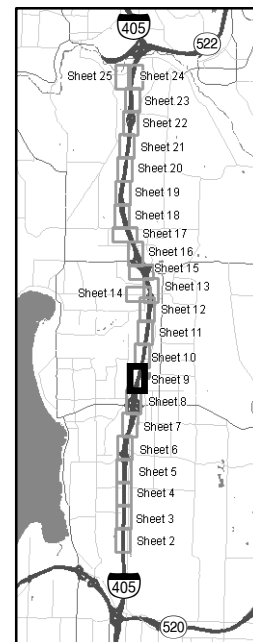
PURPOSE: Roadway Improvements  
PROPOSED/RETAIN: Fill 1.657 acres of wetlands and other waters of the U.S.  
IN: Streams and Wetlands  
AT: Kirkland  
COUNTY: King STATE: WA  
DATE: 02/03/2005



HORIZONTAL DATUM: NAD 83/91  
VERTICAL DATUM: NAVD88

**SHEET 8 of 53**

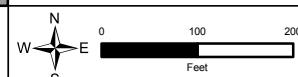
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-  Milepost
-  Cut & Fill
-  Stream
-  Road
-  Railroad
-  High Water Mark
-  Cross Section
-  Impact & Temporary Impact Line
-  Proposed ROW
-  Existing ROW
-  Proposed Drainage
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-  Existing Stormwater Facility
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<i>Wetland</i>	<i>Temporary</i>	<i>Direct</i>	<i>Indirect</i>
18.4R	0	1622	0

REFERENCE:  
**200401410**

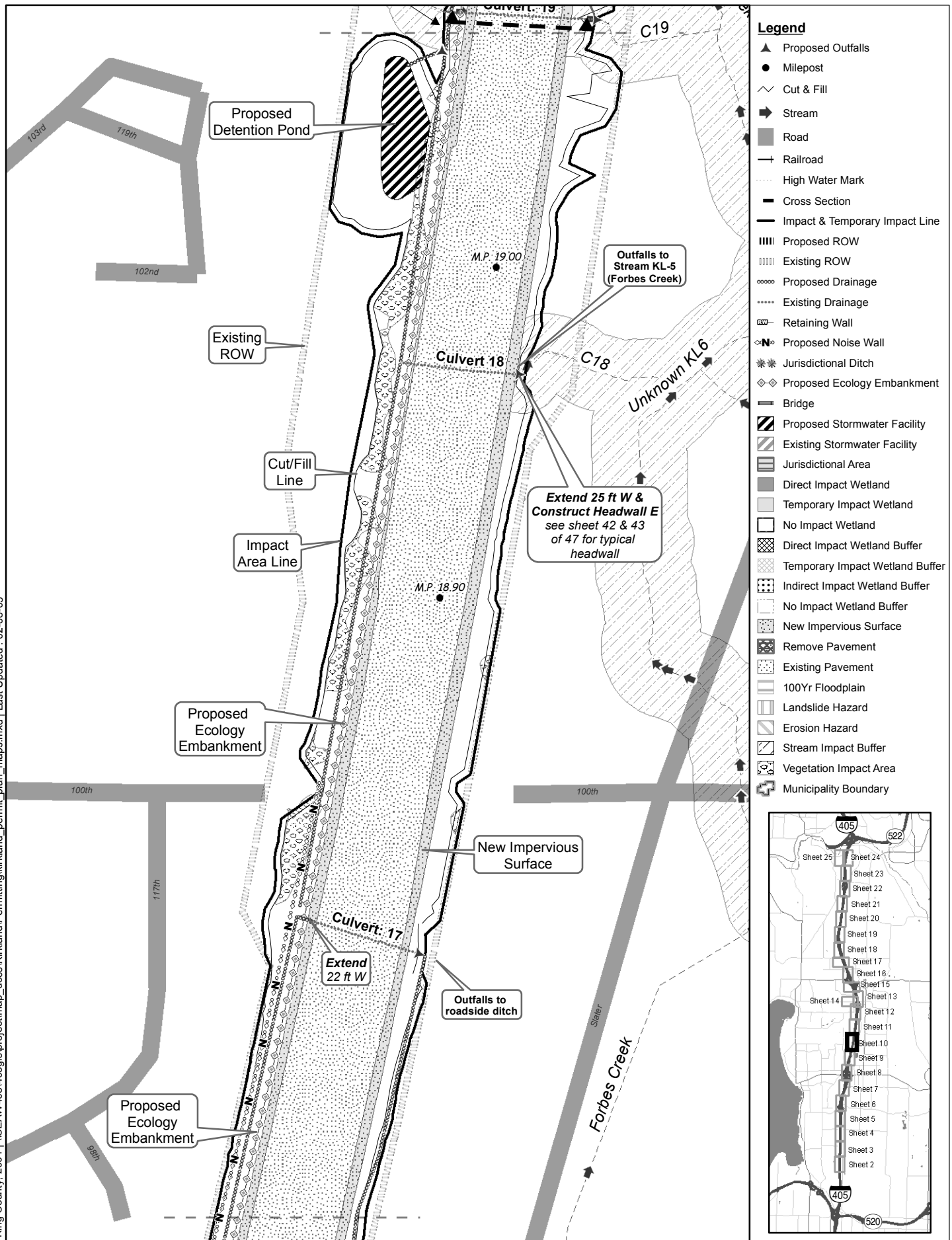
**PURPOSE:** Roadway Improvements  
**PROPOSED/RETAIN:** Fill 1.657 acres of wetlands and other waters of the U.S.  
**IN:** Streams and Wetlands  
**AT:** Kirkland  
**COUNTY:** King **STATE:** WA  
**DATE:** 02/03/2005



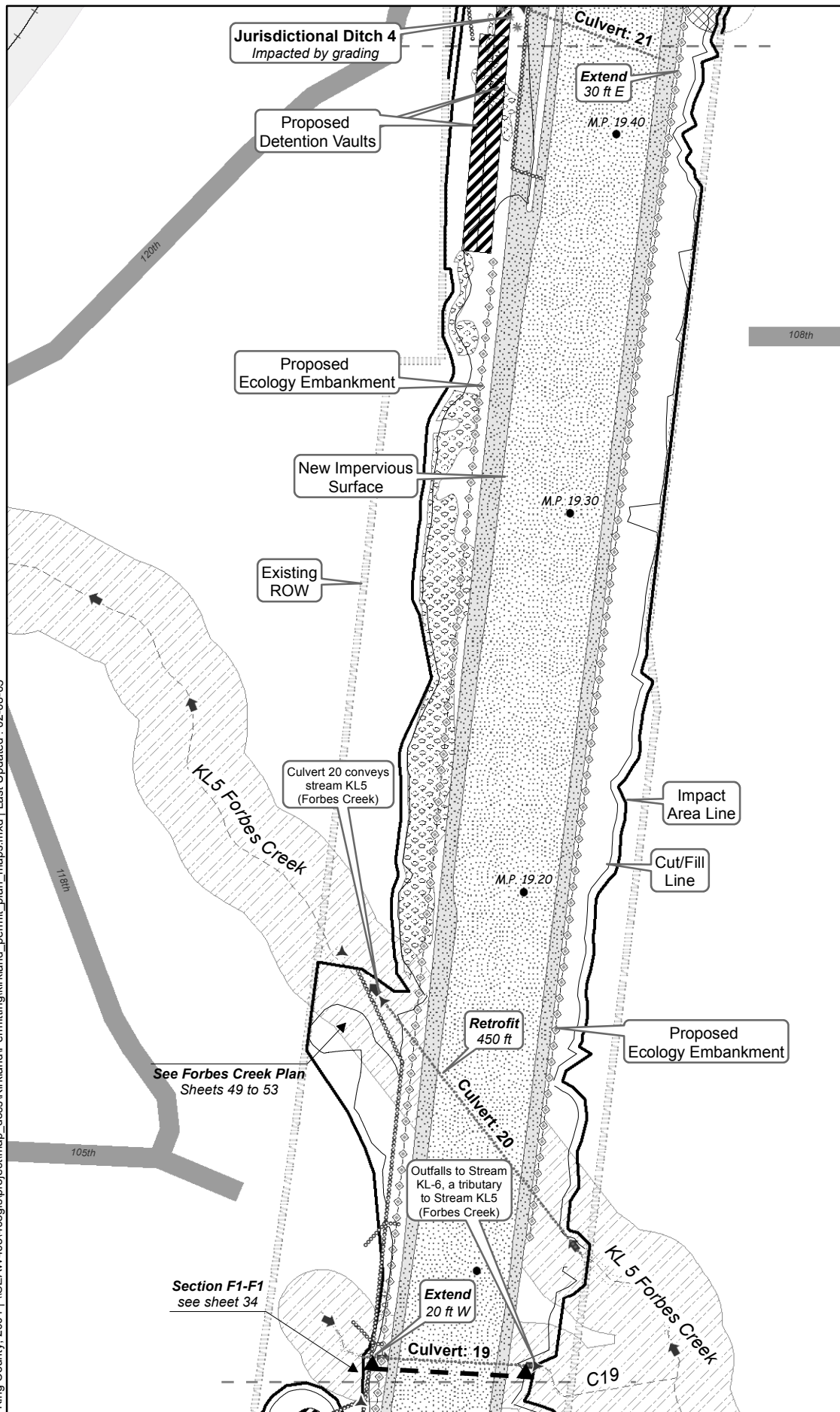
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VERTICAL DATUM: NAVD88

**SHEET 9 of 53**

Source: WSDOT, 2004. King County, 2004. I:\SEAW\405\405gis\project\map\_docs\Kirkland\Permitting\Kirkland\_permit\_plan\_maps.mxd | Last Updated : 02-08-05

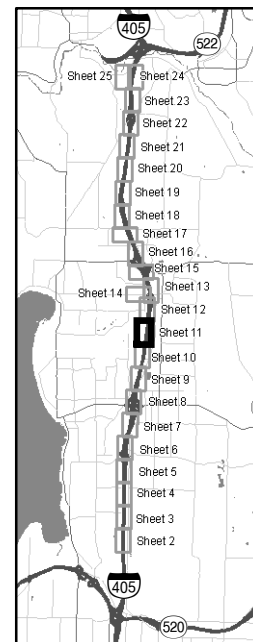


Source: WSDOT, 2004. King County, 2004. | I:\SEAW405\GIS\project\map\_docs\Kirkland\Permitting\Kirkland\_permit\_plan\_maps.mxd | Last Updated: 02-08-05



### Legend

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**NO WETLAND IMPACTS**

**I-405, SR520 to SR522**

REFERENCE:  
**200401410**

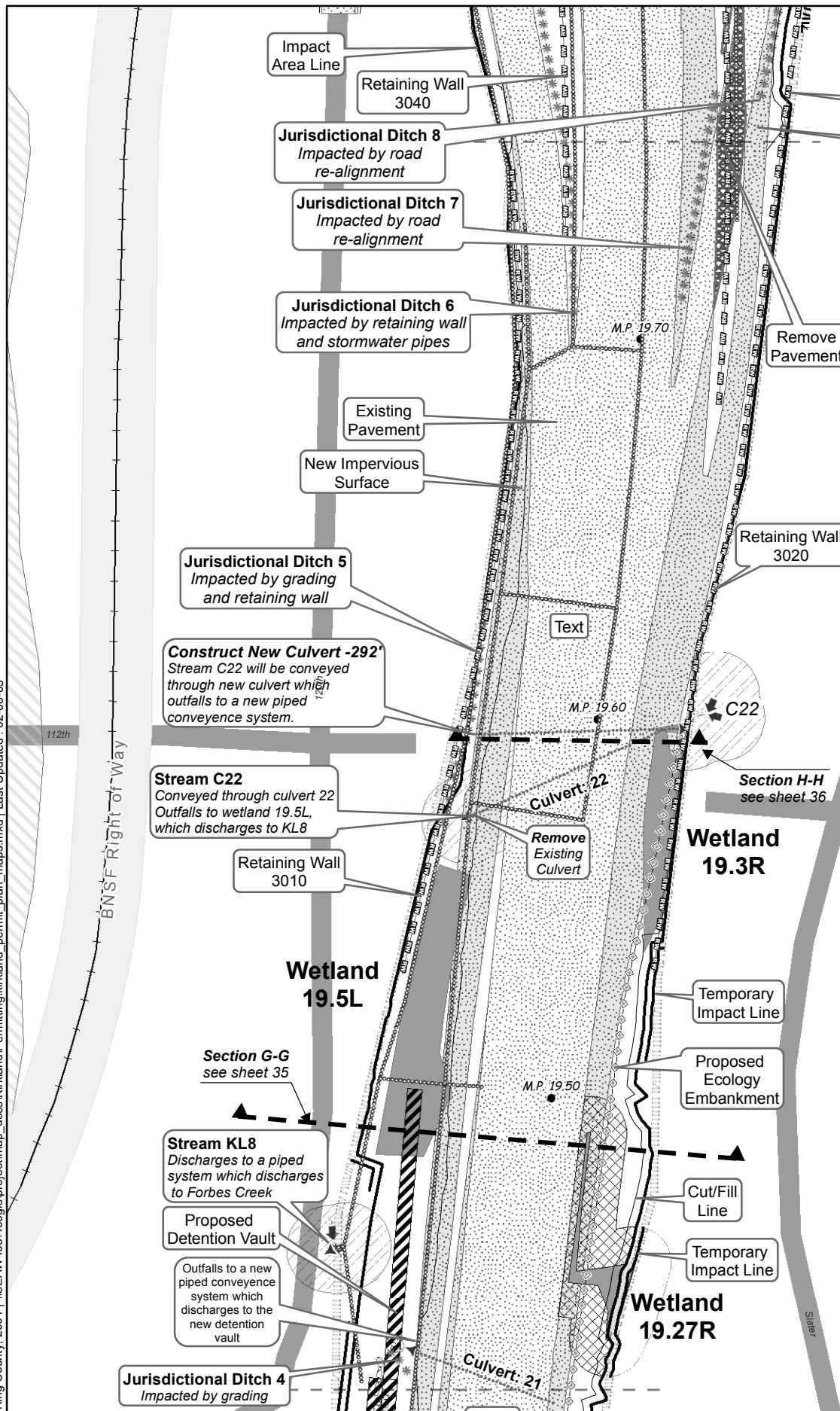
APPLICANT: WSDOT

**PURPOSE:** Roadway Improvements  
**PROPOSED/RETAIN:** Fill 1.657 acres of wetlands and other waters of the U.S.  
**IN:** Streams and Wetlands  
**AT:** Kirkland  
**COUNTY:** King **STATE:** WA  
**DATE:** 02/03/2005



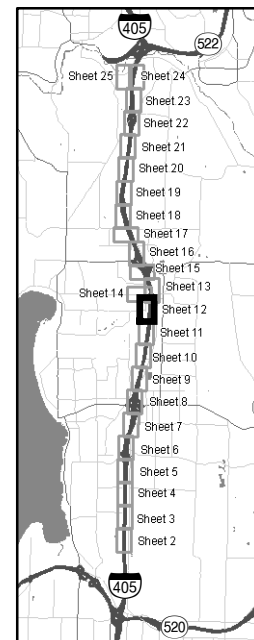
**HORIZONTAL DATUM:** NAD 83/91  
**VERTICAL DATUM:** NAVD88

**SHEET 11 of 53**



# Legend

- ▲ Proposed Outfalls
- Milepost
- ∧ Cut & Fill
- ➔ Stream
- Road
- ➔ Railroad
- ⋯ High Water Mark
- Cross Section
- Impact & Temporary Impact Line
- ||||| Proposed ROW
- ||||| Existing ROW
- ⋯ Proposed Drainage
- ⋯ Existing Drainage
- Retaining Wall
- ⋯ Proposed Noise Wall
- ✱ Jurisdictional Ditch
- ◆ Proposed Ecology Embankment
- Bridge
- ▨ Proposed Stormwater Facility
- ▨ Existing Stormwater Facility
- ▨ Jurisdictional Area
- ▨ Direct Impact Wetland
- ▨ Temporary Impact Wetland
- ▨ No Impact Wetland
- ▨ Direct Impact Wetland Buffer
- ▨ Temporary Impact Wetland Buffer
- ▨ Indirect Impact Wetland Buffer
- ▨ No Impact Wetland Buffer
- ▨ New Impervious Surface
- ▨ Remove Pavement
- ▨ Existing Pavement
- ▨ 100Yr Floodplain
- ▨ Landslide Hazard
- ▨ Erosion Hazard
- ▨ Stream Impact Buffer
- ▨ Vegetation Impact Area
- ▨ Municipality Boundary



Wetland	Temporary	Direct	Indirect
19.27R	984	3418	0
19.3R	0	10823	0
19.5L	0	24999	0

I-405, SR520 to SR522

REFERENCE:  
**200401410**

APPLICANT: WSDOT

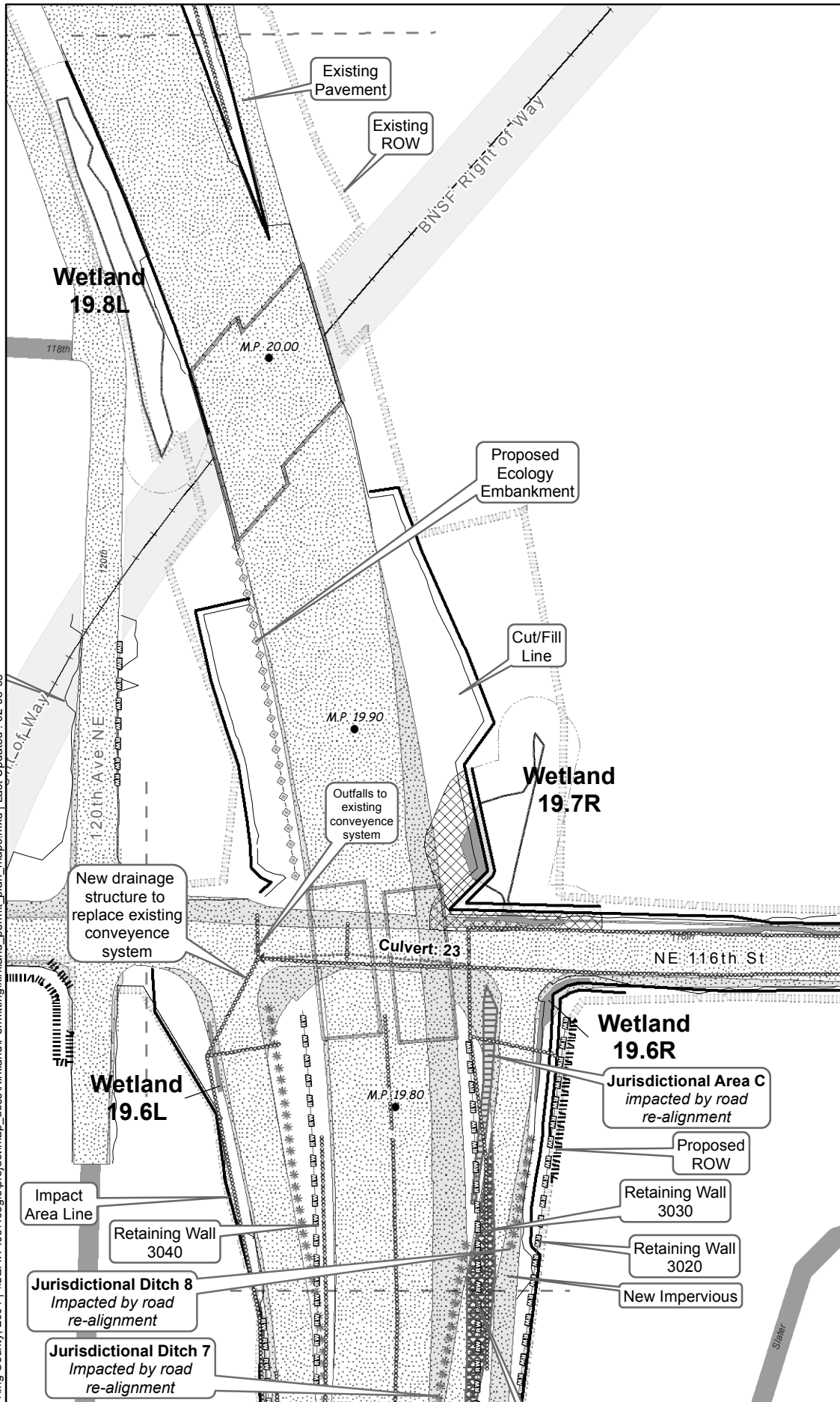
PURPOSE: Roadway Improvements  
PROPOSED/RETAIN: Fill 1.657 acres of wetlands and other waters of the U.S.  
IN: Streams and Wetlands  
AT: Kirkland  
COUNTY: King STATE: WA  
DATE: 02/03/2005



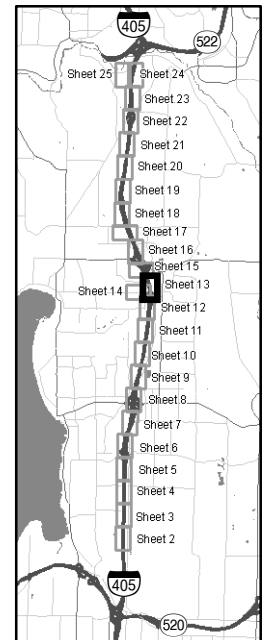
HORIZONTAL DATUM: NAD 83/91  
VERTICAL DATUM: NAVD88

SHEET 12 of 53

Source: WSDOT, 2004. King County, 2004. \\SEAW405gis\project\map\_docs\Kirkland\Permitting\Kirkland\_permit\_plan\_maps.mxd | Last Updated : 02-08-05



- Legend**
- ▲ Proposed Outfalls
  - Milepost
  - ∧ Cut & Fill
  - ➡ Stream
  - Road
  - +— Railroad
  - High Water Mark
  - Cross Section
  - Impact & Temporary Impact Line
  - ||||| Proposed ROW
  - ||||| Existing ROW
  - Proposed Drainage
  - Existing Drainage
  - Retaining Wall
  - Proposed Noise Wall
  - \*\*\* Jurisdictional Ditch
  - ◇— Proposed Ecology Embankment
  - Bridge
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  - ▨ Existing Stormwater Facility
  - ▨ Jurisdictional Area
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  - Temporary Impact Wetland
  - No Impact Wetland
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  - ▨ Temporary Impact Wetland Buffer
  - ▨ Indirect Impact Wetland Buffer
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  - ▨ 100Yr Floodplain
  - ▨ Landslide Hazard
  - ▨ Erosion Hazard
  - ▨ Stream Impact Buffer
  - ▨ Vegetation Impact Area
  - ⬢ Municipality Boundary



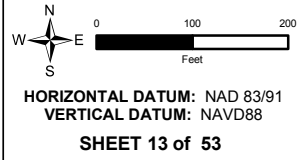
Wetland	Temporary	Direct	Indirect
19.6R	0	2216	0
19.6L	0	481	0
19.7R	1103	7127	0

**I-405, SR520 to SR522**

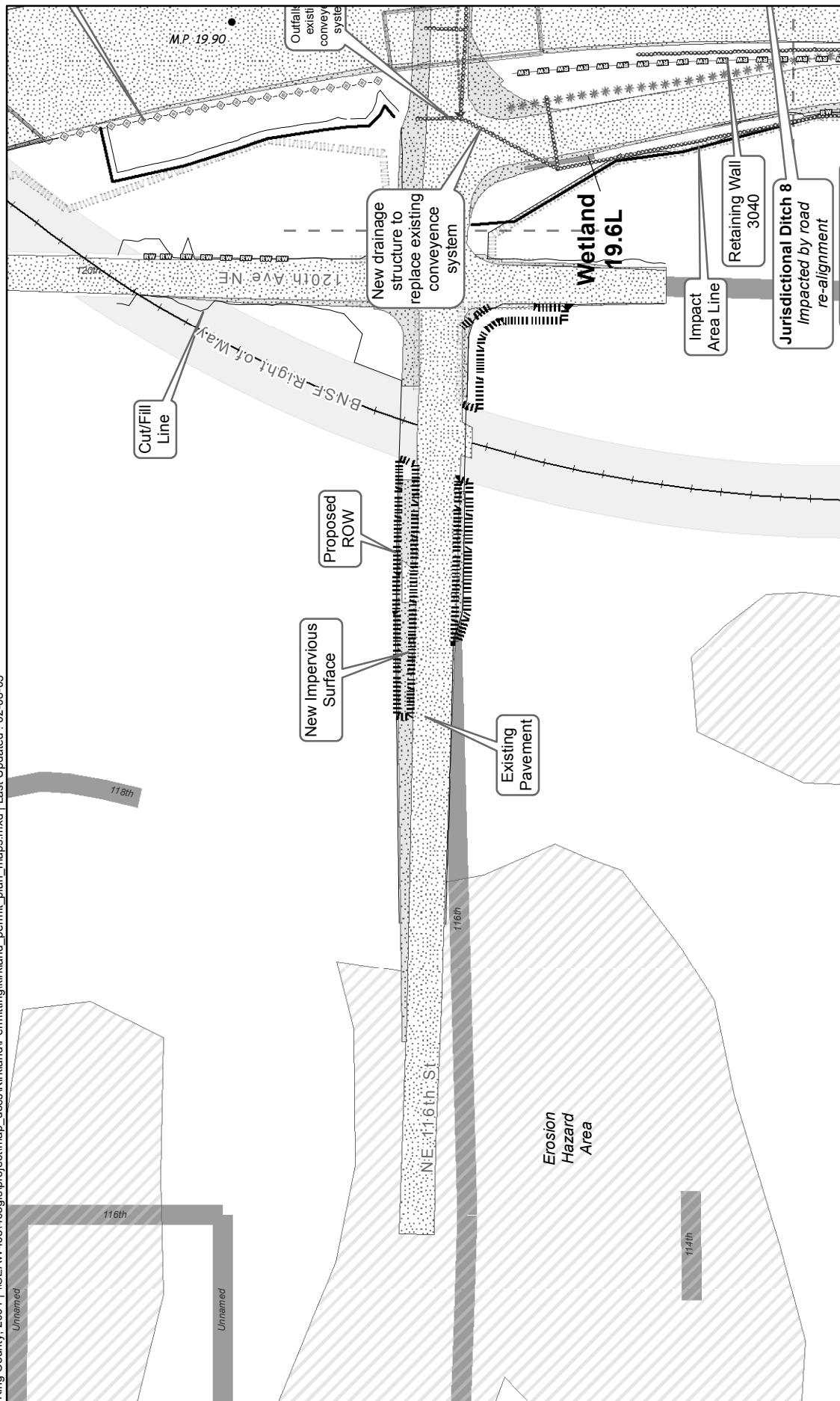
REFERENCE:  
**200401410**

APPLICANT: WSDOT

**PURPOSE:** Roadway Improvements  
**PROPOSED/RETAIN:** Fill 1.657 acres of wetlands and other waters of the U.S.  
**IN:** Streams and Wetlands  
**AT:** Kirkland  
**COUNTY:** King **STATE:** WA  
**DATE:** 02/03/2005

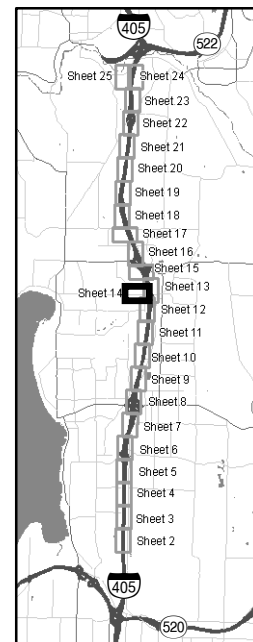


Source: WSDOT; 2004. King County; 2004. I:\SEAW\405\gis\project\map\_docs\Kirkland\Permitting\Kirkland\_permit\_plan\_maps.mxd | Last Updated : 02-08-05



### Legend

- ▲ Proposed Outfalls
- Milepost
- ∧ Cut & Fill
- Stream
- Road
- Railroad
- ⋯ High Water Mark
- Cross Section
- Impact & Temporary Impact Line
- ||||| Proposed ROW
- ||||| Existing ROW
- ⋯ Proposed Drainage
- ⋯ Existing Drainage
- Retaining Wall
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- ▨ Jurisdictional Area
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- No Impact Wetland
- ▨ Direct Impact Wetland Buffer
- ▨ Temporary Impact Wetland Buffer
- ▨ Indirect Impact Wetland Buffer
- No Impact Wetland Buffer
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- ▨ Remove Pavement
- ▨ Existing Pavement
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- ▨ Landslide Hazard
- ▨ Erosion Hazard
- ▨ Stream Impact Buffer
- ▨ Vegetation Impact Area
- ⬢ Municipality Boundary



### WETLAND IMPACTS (sf)

Wetland	Temporary	Direct	Indirect
19.6L	0	481	0

### I-405, SR520 to SR522

REFERENCE:

**200401410**

APPLICANT: WSDOT

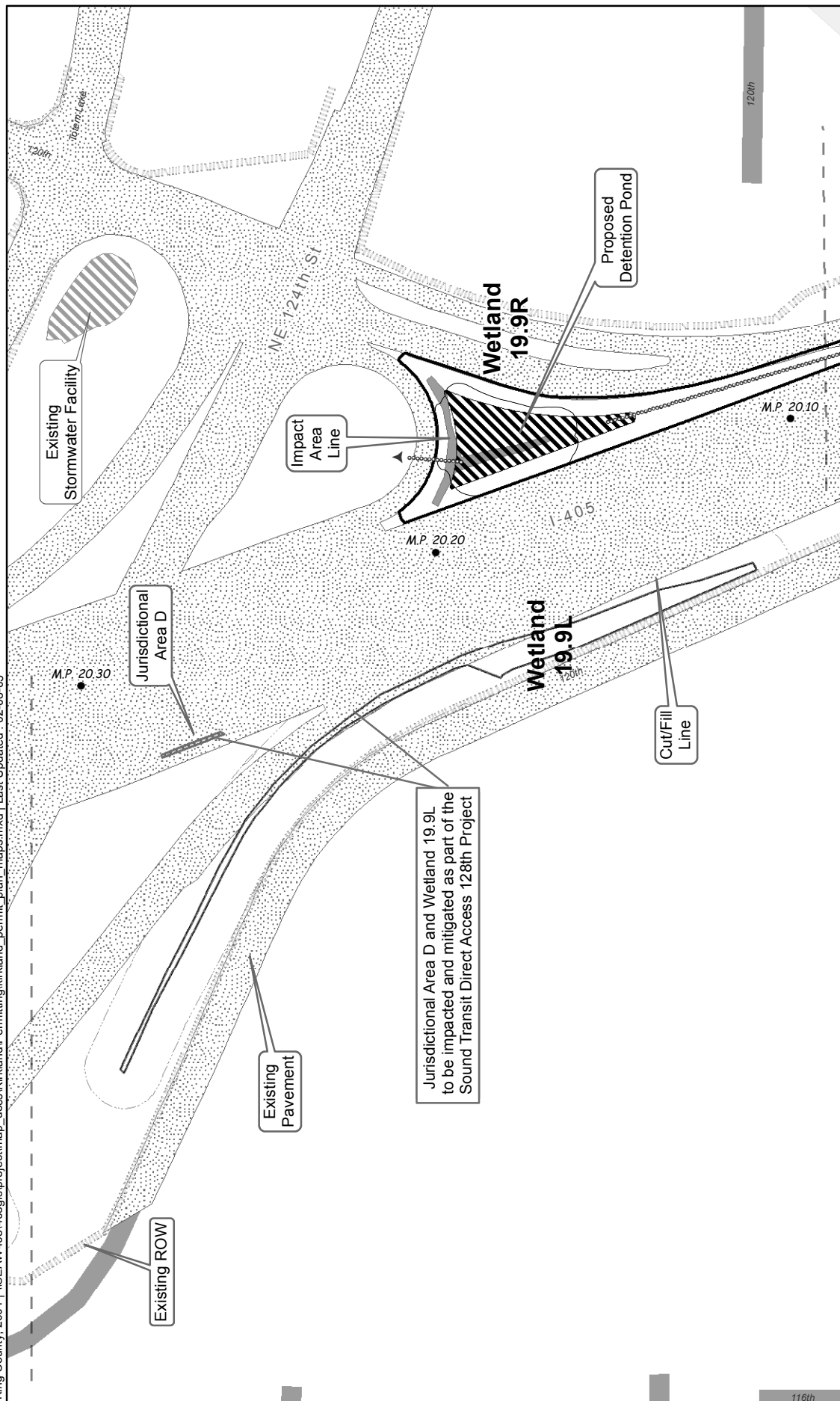
**PURPOSE:** Roadway Improvements  
**PROPOSED/RETAIN:** Fill 1.657 acres of wetlands and other waters of the U.S.  
**IN:** Streams and Wetlands  
**AT:** Kirkland  
**COUNTY:** King **STATE:** WA  
**DATE:** 02/03/2005



**HORIZONTAL DATUM:** NAD 83/91  
**VERTICAL DATUM:** NAVD88

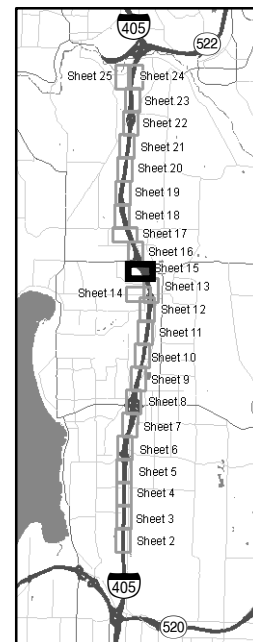
**SHEET 14 of 53**

Source: WSDOT, 2004. King County, 2004. I:\SEAW\405\405gis\project\map\_docs\Kirkland\Permitting\Kirkland\_permit\_map.mxd | Last Updated: 02-08-05



### Legend

- ▲ Proposed Outfalls
- Milepost
- ∧ Cut & Fill
- ➔ Stream
- Road
- Railroad
- ⋯ High Water Mark
- Cross Section
- Impact & Temporary Impact Line
- ||||| Proposed ROW
- ||||| Existing ROW
- ⋯ Proposed Drainage
- ⋯ Existing Drainage
- Retaining Wall
- Proposed Noise Wall
- Jurisdictional Ditch
- Proposed Ecology Embankment
- Bridge
- ▨ Proposed Stormwater Facility
- ▨ Existing Stormwater Facility
- ▨ Jurisdictional Area
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- ▨ Temporary Impact Wetland
- ▨ No Impact Wetland
- ▨ Direct Impact Wetland Buffer
- ▨ Temporary Impact Wetland Buffer
- ▨ Indirect Impact Wetland Buffer
- ▨ No Impact Wetland Buffer
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- ▨ Remove Pavement
- ▨ Existing Pavement
- ▨ 100Yr Floodplain
- ▨ Landslide Hazard
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- ▨ Vegetation Impact Area
- ▨ Municipality Boundary



Wetland	Temporary	Direct	Indirect
19.9R	0	3021	790

### I-405, SR520 to SR522

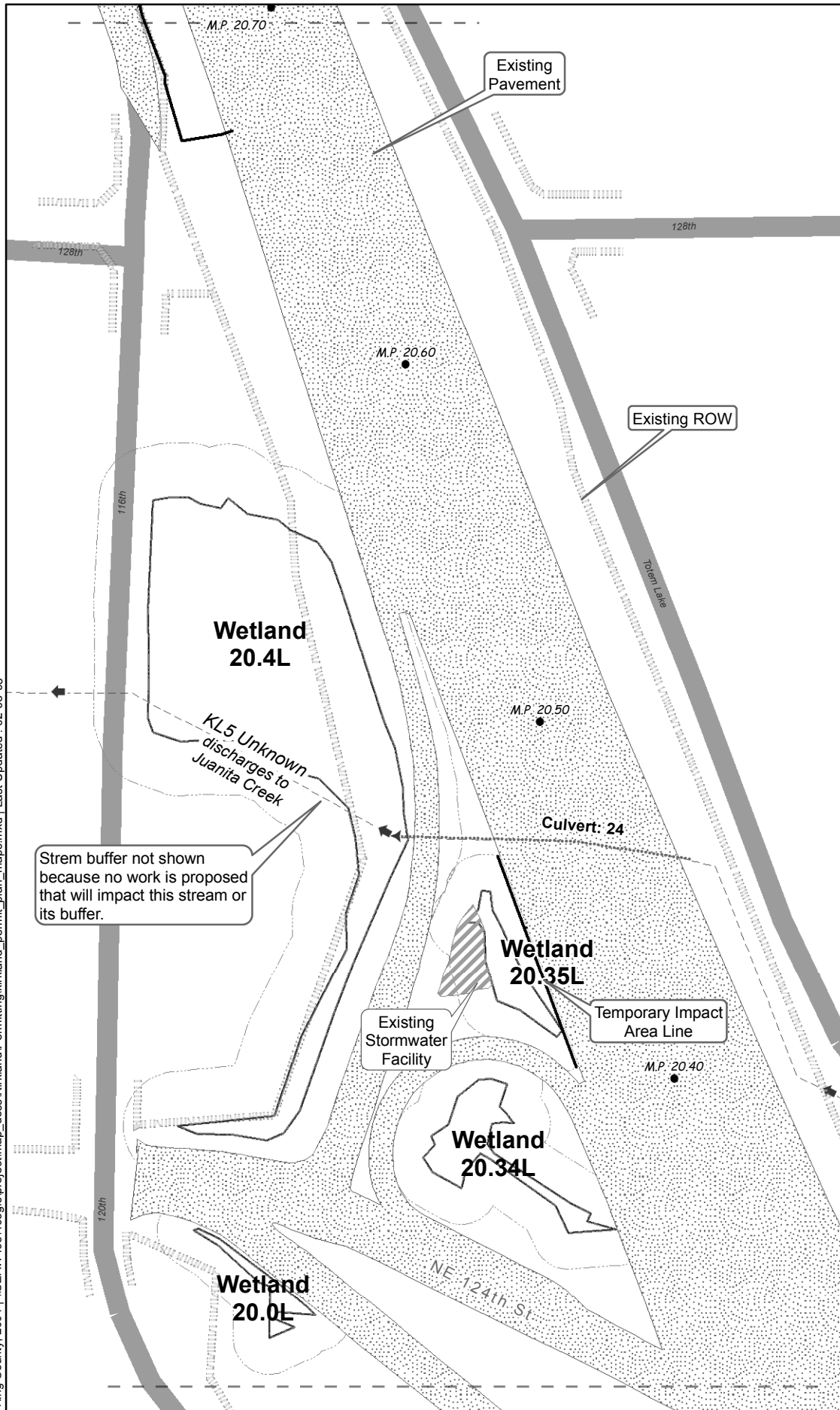
REFERENCE:  
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APPLICANT: WSDOT

**PURPOSE:** Roadway Improvements  
**PROPOSED/RETAIN:** Fill 1.657 acres of wetlands and other waters of the U.S.  
**IN:** Streams and Wetlands  
**AT:** Kirkland  
**COUNTY:** King **STATE:** WA  
**DATE:** 02/03/2005

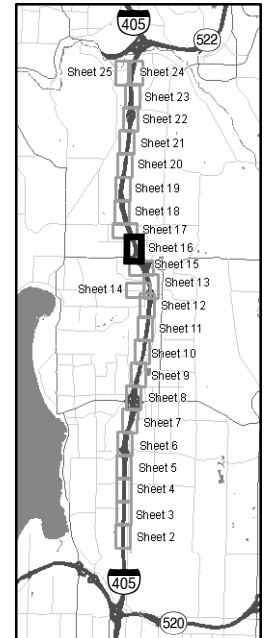
**HORIZONTAL DATUM:** NAD 83/91  
**VERTICAL DATUM:** NAVD88  
**SHEET 15 of 53**

Source: WSDOT, 2004. King County, 2004. | I:\SEAW405\GIS\project\map\_docs\Kirkland\Permitting\Kirkland\_permit\_plan\_maps.mxd | Last Updated : 02-08-05



### Legend

- ▲ Proposed Outfalls
- Milepost
- ∧ Cut & Fill
- ➡ Stream
- Road
- ➡ Railroad
- High Water Mark
- Cross Section
- Impact & Temporary Impact Line
- ||||| Proposed ROW
- ||||| Existing ROW
- ooooo Proposed Drainage
- Existing Drainage
- Retaining Wall
- Proposed Noise Wall
- \*\*\* Jurisdictional Ditch
- ◇ Proposed Ecology Embankment
- Bridge
- ▨ Proposed Stormwater Facility
- ▨ Existing Stormwater Facility
- ▨ Jurisdictional Area
- Direct Impact Wetland
- Temporary Impact Wetland
- No Impact Wetland
- ▨ Direct Impact Wetland Buffer
- ▨ Temporary Impact Wetland Buffer
- ▨ Indirect Impact Wetland Buffer
- No Impact Wetland Buffer
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- ▨ Remove Pavement
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- ▨ 100Yr Floodplain
- ▨ Landslide Hazard
- ▨ Erosion Hazard
- ▨ Stream Impact Buffer
- ▨ Vegetation Impact Area
- ▨ Municipality Boundary



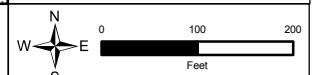
**NO WETLAND IMPACTS**

**I-405, SR520 to SR522**

REFERENCE:  
**200401410**

APPLICANT: WSDOT

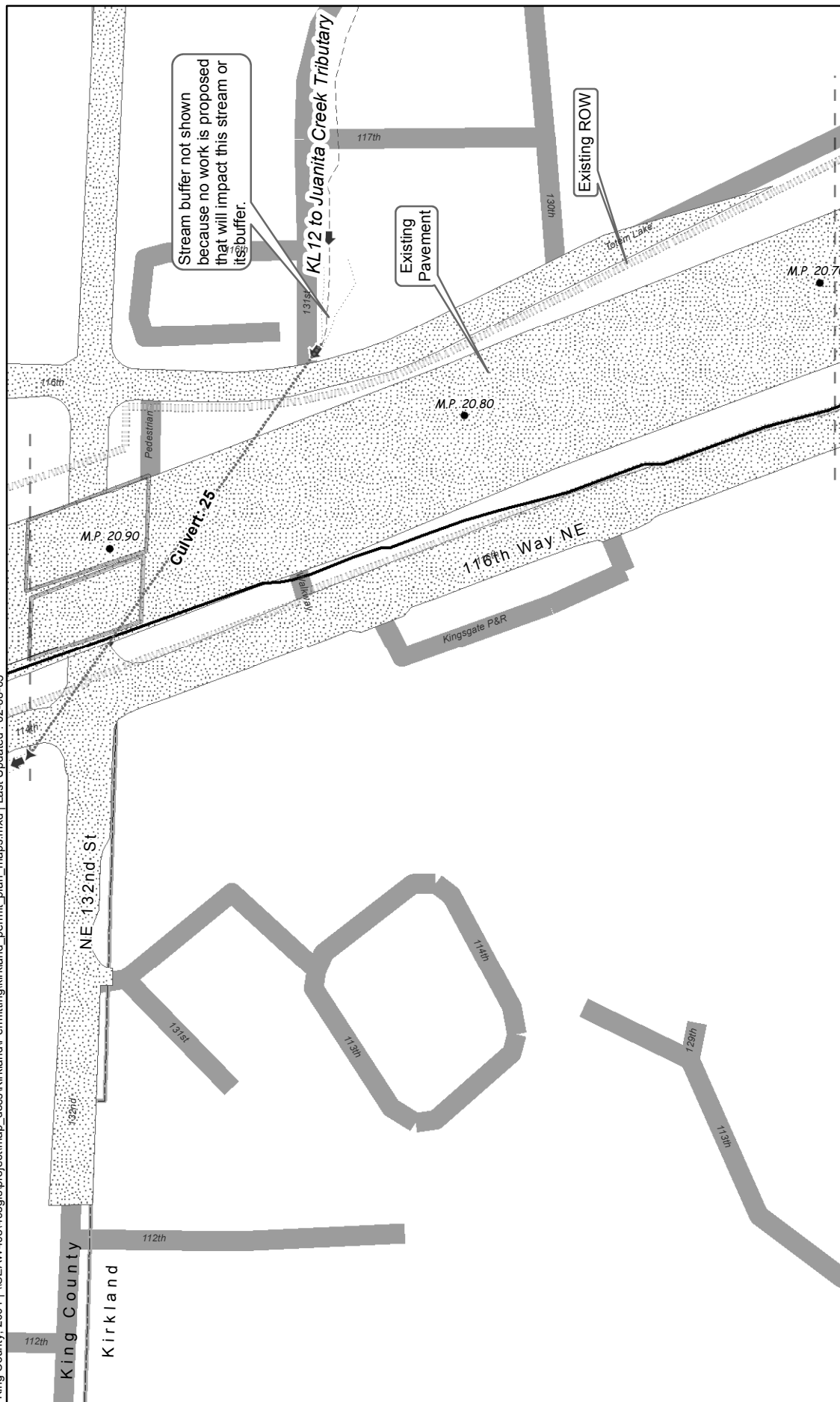
**PURPOSE:** Roadway Improvements  
**PROPOSED/RETAIN:** Fill 1.657 acres of wetlands and other waters of the U.S.  
**IN:** Streams and Wetlands  
**AT:** Kirkland  
**COUNTY:** King **STATE:** WA  
**DATE:** 02/03/2005



**HORIZONTAL DATUM:** NAD 83/91  
**VERTICAL DATUM:** NAVD88

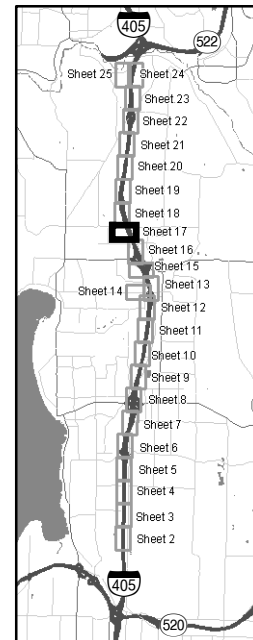
**SHEET 16 of 53**

Source: WSDOT, 2004. King County, 2004. | \\SEAW405\gis\project\map\_docs\Kirkland\Permitting\Kirkland\_permit\_plan\_maps.mxd | Last Updated : 02-08-05



## Legend

- ▲ Proposed Outfalls
- Milepost
- ∧ Cut & Fill
- ➔ Stream
- Road
- ➔ Railroad
- High Water Mark
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- ||||| Proposed ROW
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- 100Yr Floodplain
- Landslide Hazard
- Erosion Hazard
- Stream Impact Buffer
- Vegetation Impact Area
- Municipality Boundary



**NO WETLAND IMPACTS**

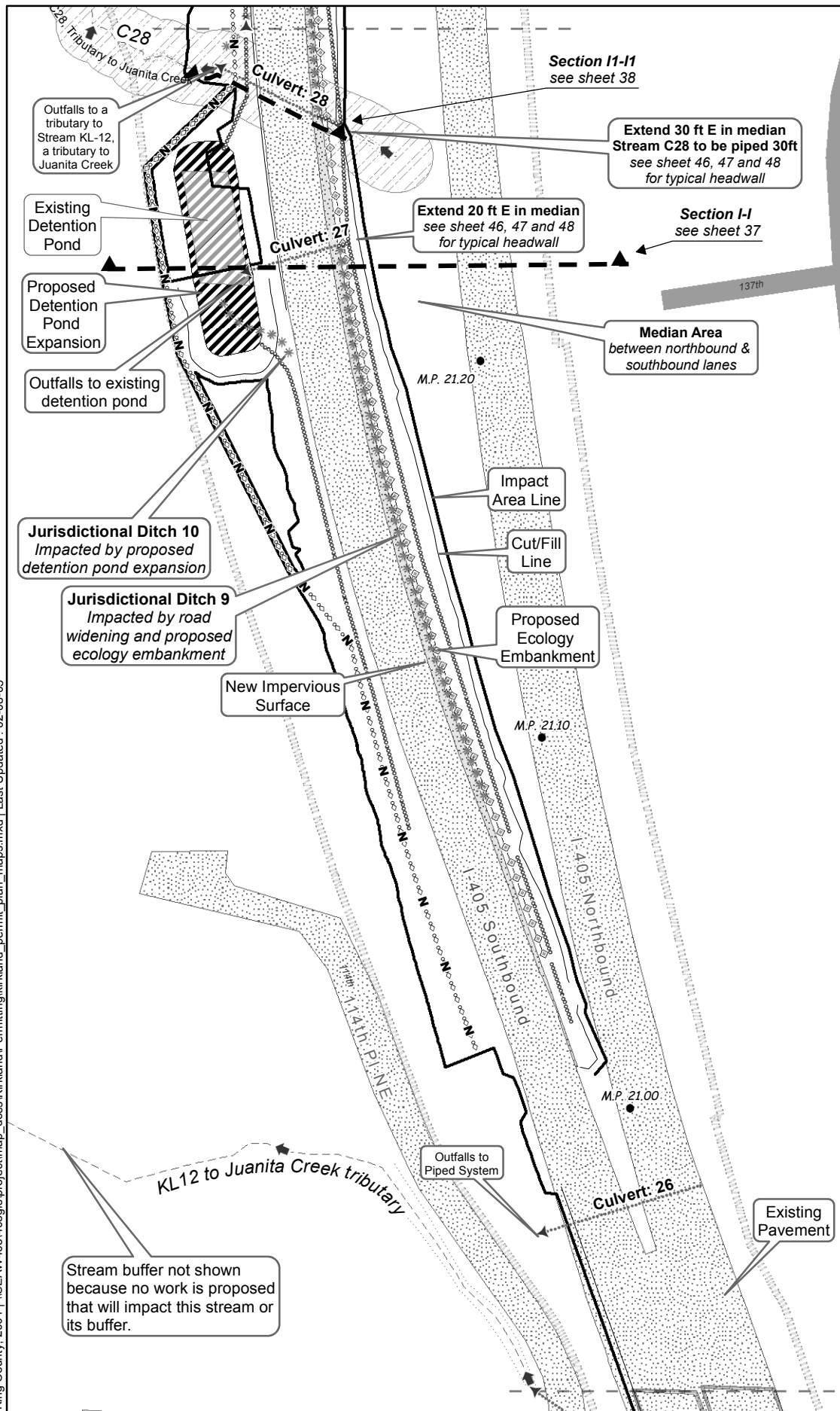
**I-405, SR520 to SR522**

REFERENCE:  
**200401410**

APPLICANT: WSDOT

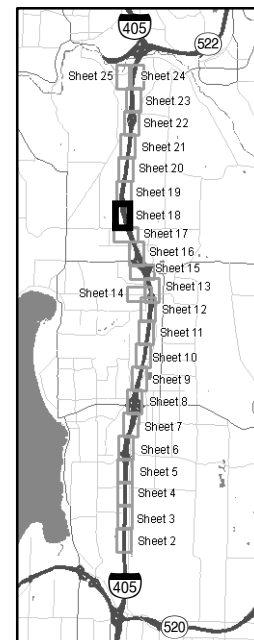
**PURPOSE:** Roadway Improvements  
**PROPOSED/RETAIN:** Fill 1.657 acres of wetlands and other waters of the U.S.  
**IN:** Streams and Wetlands  
**NEAR:** Kirkland  
**COUNTY:** King **STATE:** WA  
**DATE:** 02/03/2005

**HORIZONTAL DATUM:** NAD 83/91  
**VERTICAL DATUM:** NAVD88  
**SHEET 17 of 53**



# **Legend**

- ▲ Proposed Outfalls
- Milepost
- ∧ Cut & Fill
- ➔ Stream
- Road
- ➔ Railroad
- High Water Mark
- Cross Section
- Impact & Temporary Impact Line
- ||||| Proposed ROW
- ||||| Existing ROW
- Proposed Drainage
- Existing Drainage
- Retaining Wall
- Proposed Noise Wall
- \*\*\* Jurisdictional Ditch
- ◆◆ Proposed Ecology Embankment
- Bridge
- ▨ Proposed Stormwater Facility
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- ▨ Jurisdictional Area
- Direct Impact Wetland
- Temporary Impact Wetland
- No Impact Wetland
- ▨ Direct Impact Wetland Buffer
- ▨ Temporary Impact Wetland Buffer
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- No Impact Wetland Buffer
- ▨ New Impervious Surface
- ▨ Remove Pavement
- ▨ Existing Pavement
- ▨ 100Yr Floodplain
- ▨ Landslide Hazard
- ▨ Erosion Hazard
- ▨ Stream Impact Buffer
- ▨ Vegetation Impact Area
- ▨ Municipality Boundary



**NO WETLAND IMPACTS**

**I-405, SR520 to SR522**

REFERENCE:  
**200401410**

APPLICANT: WSDOT

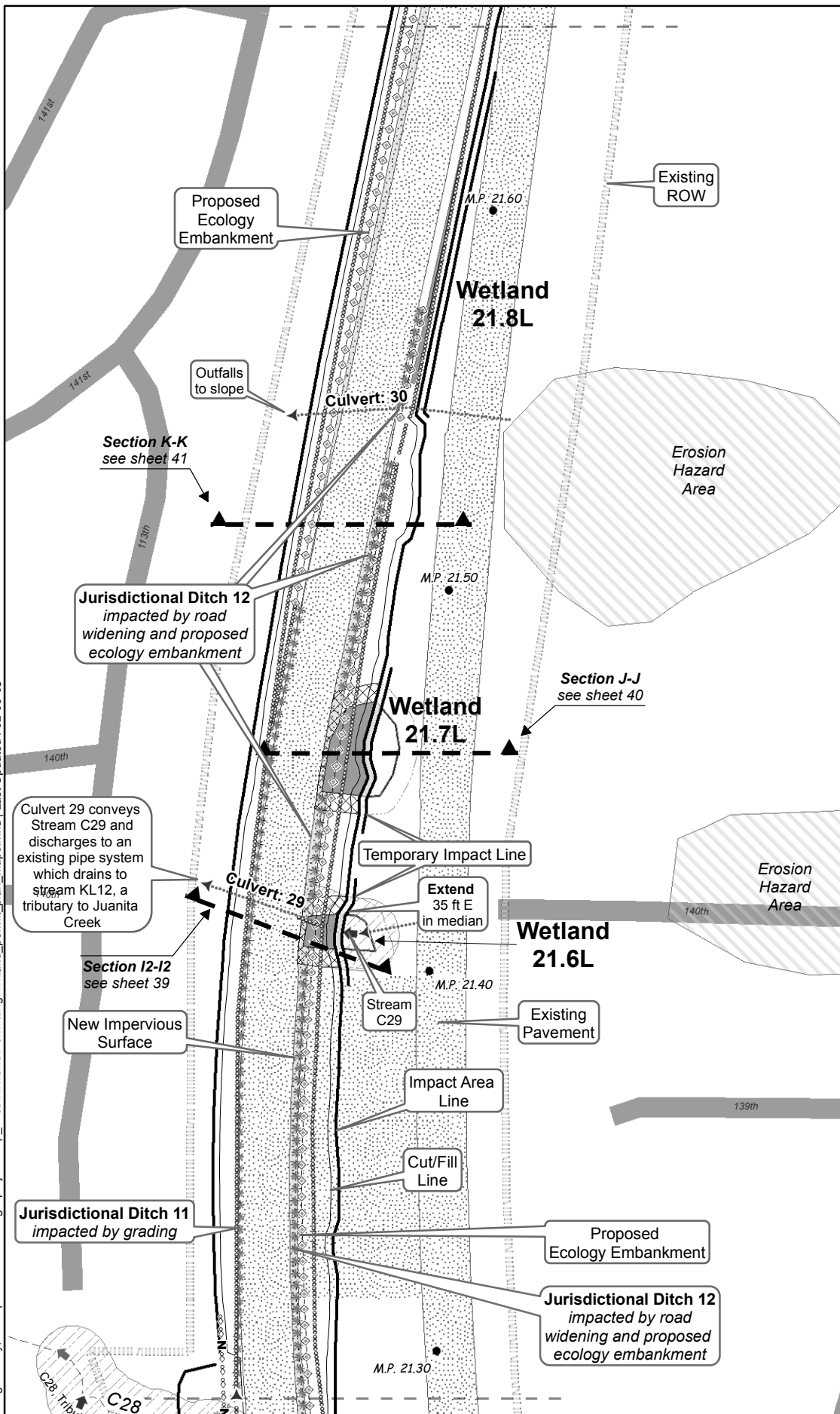
**PURPOSE:** Roadway Improvements  
**PROPOSED/RETAIN:** Fill 1.657 acres of wetlands and other waters of the U.S.  
**IN:** Streams and Wetlands  
**NEAR:** Kirkland  
**COUNTY:** King **STATE:** WA  
**DATE:** 02/03/2005



**HORIZONTAL DATUM:** NAD 83/91  
**VERTICAL DATUM:** NAVD88

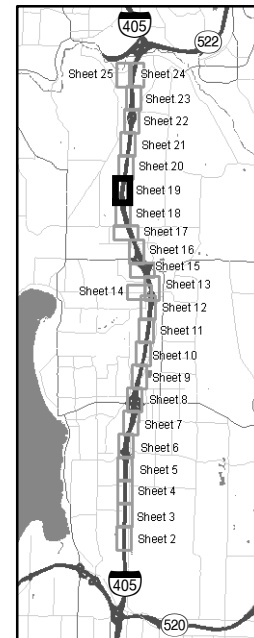
**SHEET 18 of 53**

Source: WSDOT, 2004. King County, 2004 | \\SEAW405\gis\project\map\_docs\Kirkland\Permitting\Kirkland\_permit\_plan\_maps.mxd | Last Updated : 02-08-05



#### Legend

- ▲ Proposed Outfalls
- Milepost
- ∧ Cut & Fill
- ➔ Stream
- ▬ Road
- ➔ Railroad
- High Water Mark
- Cross Section
- Impact & Temporary Impact Line
- ||||| Proposed ROW
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- Proposed Drainage
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- N Proposed Noise Wall
- \*\*\* Jurisdictional Ditch
- ◇◇◇ Proposed Ecology Embankment
- Bridge
- ▨ Proposed Stormwater Facility
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- ▨ Municipality Boundary



#### WETLAND IMPACTS (sf)

Wetland	Temporary	Direct	Indirect
21.6L	479	1850	0
21.7L	1334	6016	0
21.8L	0	2358	0

#### I-405, SR520 to SR522

REFERENCE:  
**200401410**

APPLICANT: WSDOT

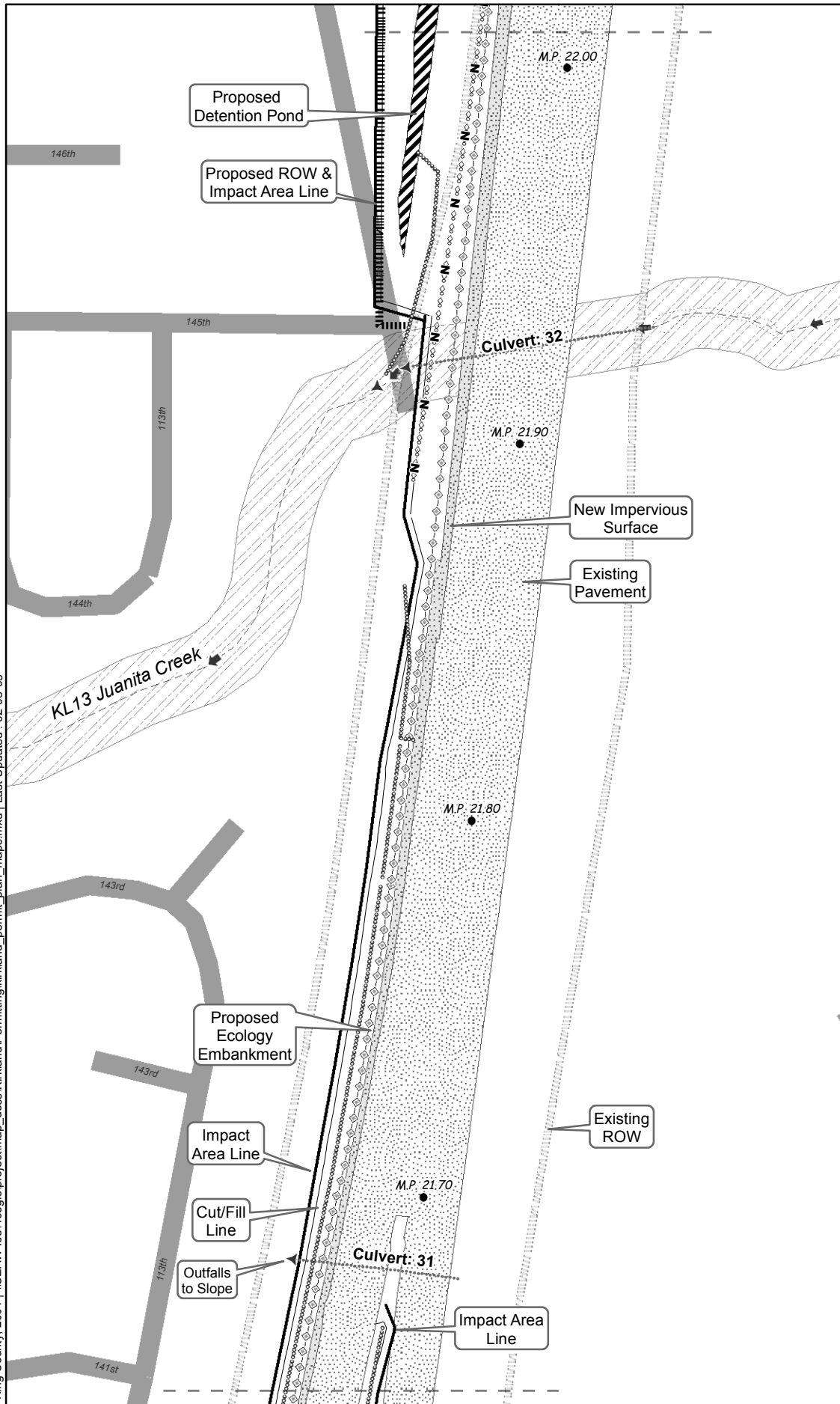
PURPOSE: Roadway Improvements  
PROPOSED/RETAIN: Fill 1.657 acres of wetlands and other waters of the U.S.  
IN: Streams and Wetlands  
NEAR: Kirkland  
COUNTY: King STATE: WA  
DATE: 02/03/2005



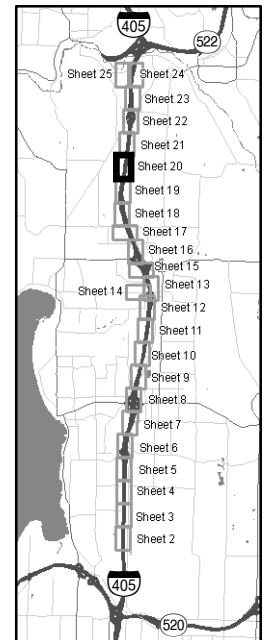
HORIZONTAL DATUM: NAD 83/91  
VERTICAL DATUM: NAVD88

SHEET 19 of 53

Source: WSDOT, 2004. King County, 2004. | I:\SEAW\405\gis\project\map\_docs\Kirkland\Permitting\Kirkland\_permit\_plan\_maps.mxd | Last Updated: 02-08-05



- Legend**
- ▲ Proposed Outfalls
  - Milepost
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  - ▨ Stream Impact Buffer
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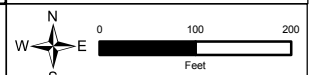
**NO WETLAND IMPACTS**

**I-405, SR520 to SR522**

REFERENCE:  
**200401410**

APPLICANT: WSDOT

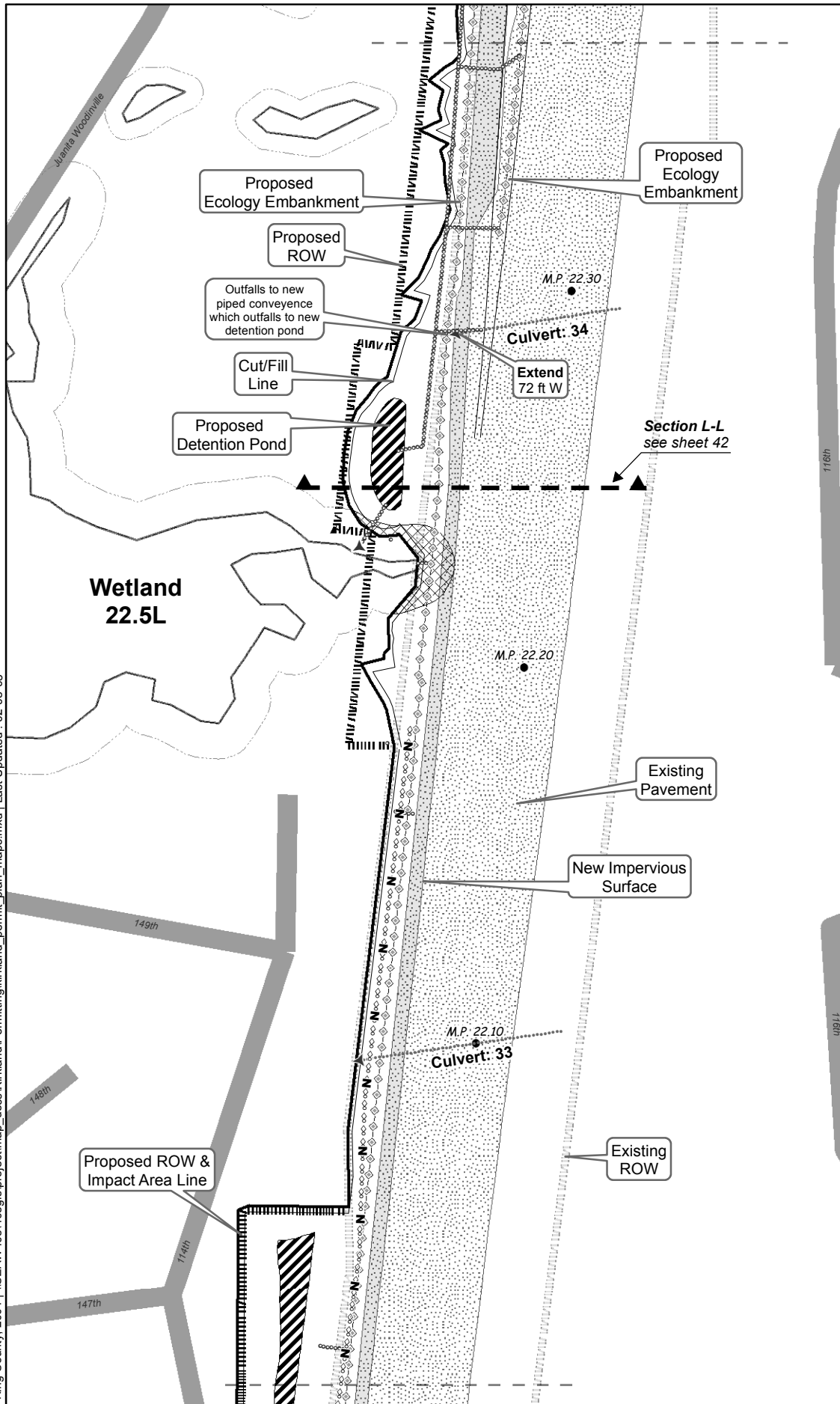
**PURPOSE:** Roadway Improvements  
**PROPOSED/RETAIN:** Fill 1.657 acres of wetlands and other waters of the U.S.  
**IN:** Streams and Wetlands  
**NEAR:** Bothell  
**COUNTY:** King **STATE:** WA  
**DATE:** 02/03/2005



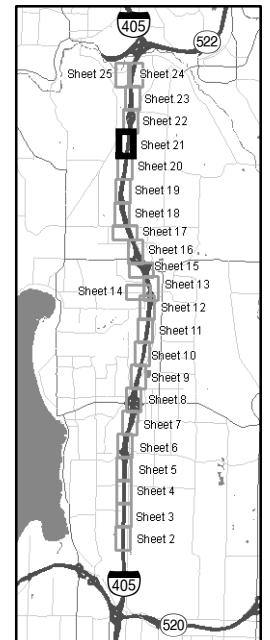
**HORIZONTAL DATUM:** NAD 83/91  
**VERTICAL DATUM:** NAVD88

**SHEET 20 of 53**

Source: WSDOT, 2004. King County, 2004 | I:\SEAW405\GIS\project\map\_docs\Kirkland\Permitting\kirkland\_permit\_plan\_maps.mxd | Last Updated : 02-08-05



- Legend**
- ▲ Proposed Outfalls
  - Milepost
  - ∧ Cut & Fill
  - ➡ Stream
  - Road
  - ➡ Railroad
  - High Water Mark
  - Cross Section
  - Impact & Temporary Impact Line
  - ||||| Proposed ROW
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  - Existing Drainage
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  - N Proposed Noise Wall
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  - Direct Impact Wetland
  - Temporary Impact Wetland
  - No Impact Wetland
  - ▨ Direct Impact Wetland Buffer
  - ▨ Temporary Impact Wetland Buffer
  - ▨ Indirect Impact Wetland Buffer
  - No Impact Wetland Buffer
  - ▨ New Impervious Surface
  - ▨ Remove Pavement
  - ▨ Existing Pavement
  - ▨ 100Yr Floodplain
  - ▨ Landslide Hazard
  - ▨ Erosion Hazard
  - ▨ Stream Impact Buffer
  - ▨ Vegetation Impact Area
  - ▨ Municipality Boundary



**NO WETLAND IMPACTS**

**I-405, SR520 to SR522**

REFERENCE:  
**200401410**

APPLICANT: WSDOT

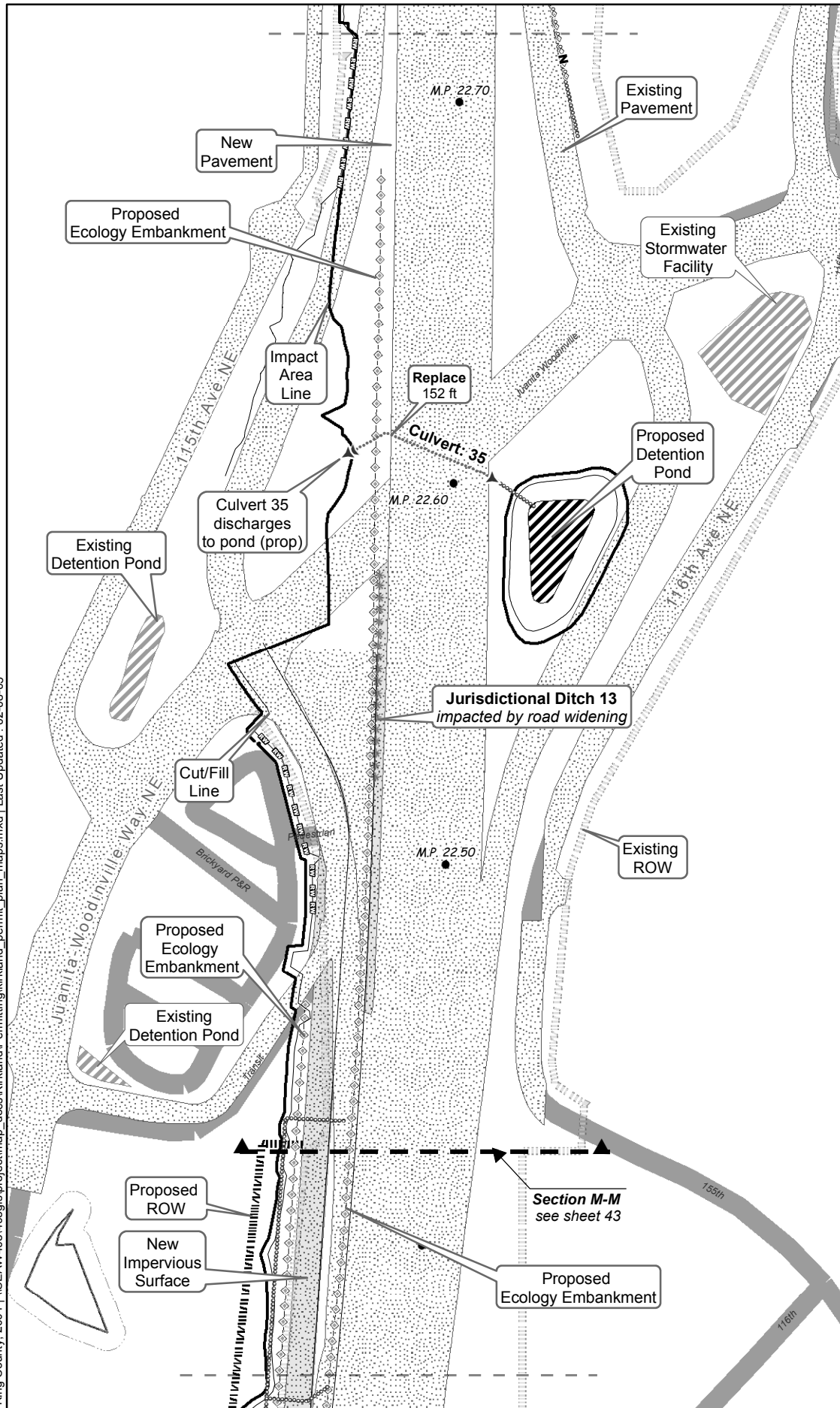
**PURPOSE:** Roadway Improvements  
**PROPOSED/RETAIN:** Fill 1.657 acres of wetlands and other waters of the U.S.  
**IN:** Streams and Wetlands  
**NEAR:** Bothell  
**COUNTY:** King **STATE:** WA  
**DATE:** 02/03/2005



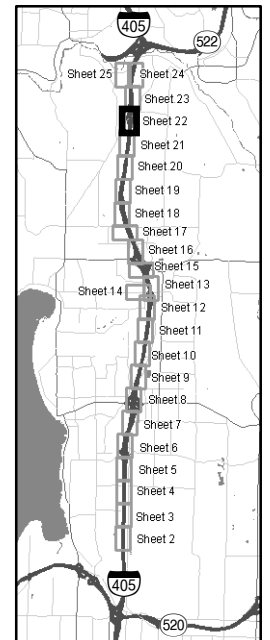
**HORIZONTAL DATUM:** NAD 83/91  
**VERTICAL DATUM:** NAVD88

**SHEET 21 of 53**

Source: WSDOT, 2004. King County, 2004. I:\SEAW-405\gis\project\map\_docs\Kirkland\Permitting\Kirkland\_permit\_plan\_maps.mxd | Last Updated: 02-08-05



- Legend**
- ▲ Proposed Outfalls
  - Milepost
  - ∧ Cut & Fill
  - ➡ Stream
  - ▬ Road
  - ➡ Railroad
  - High Water Mark
  - Cross Section
  - Impact & Temporary Impact Line
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  - ▨ No Impact Wetland
  - ▨ Direct Impact Wetland Buffer
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  - ▨ Indirect Impact Wetland Buffer
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  - ▨ New Impervious Surface
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  - ▨ 100Yr Floodplain
  - ▨ Landslide Hazard
  - ▨ Erosion Hazard
  - ▨ Stream Impact Buffer
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  - ▨ Municipality Boundary



**NO WETLAND IMPACTS**

**I-405, SR520 to SR522**

REFERENCE:  
**200401410**

APPLICANT: WSDOT

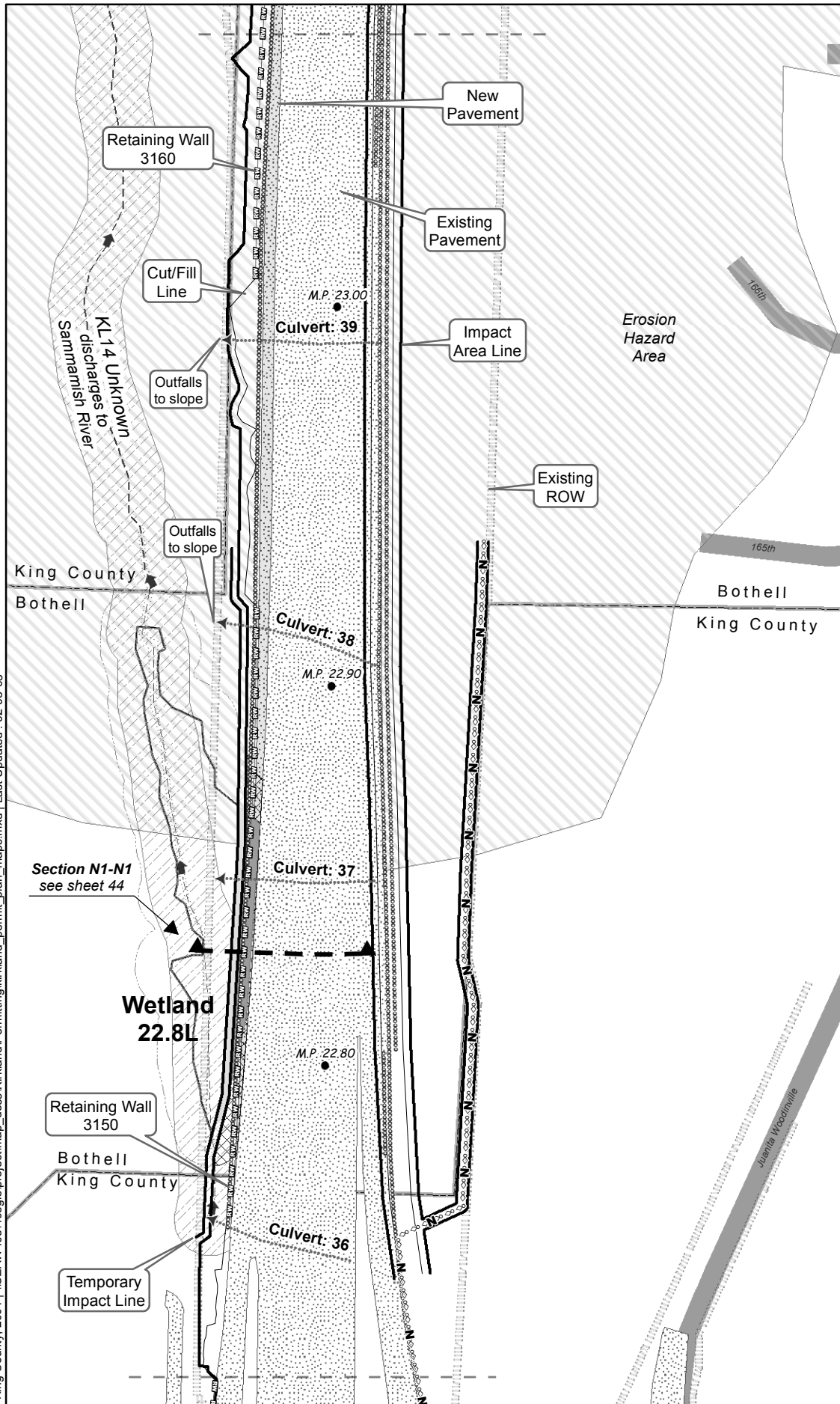
**PURPOSE:** Roadway Improvements  
**PROPOSED/RETAIN:** Fill 1.657 acres of wetlands and other waters of the U.S.  
**IN:** Streams and Wetlands  
**NEAR:** Bothell  
**COUNTY:** King **STATE:** WA  
**DATE:** 02/03/2005



**HORIZONTAL DATUM:** NAD 83/91  
**VERTICAL DATUM:** NAVD88

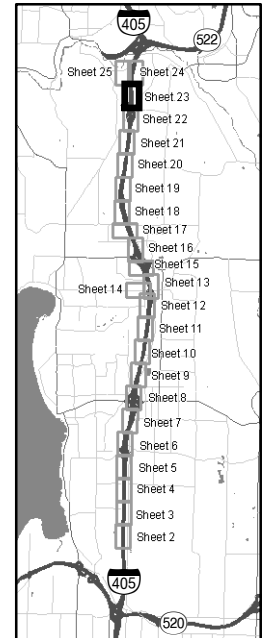
**SHEET 22 of 53**

Source: WSDOT, 2004. King County, 2004. I:\SEAW\405\gis\project\map\_docs\Kirkland\Permitting\kirkland\_permit\_plan\_maps.mxd | Last Updated : 02-08-05



#### Legend

- ▲ Proposed Outfalls
- Milepost
- ∧ Cut & Fill
- ➔ Stream
- Road
- ➔ Railroad
- High Water Mark
- Cross Section
- Impact & Temporary Impact Line
- ||||| Proposed ROW
- ||||| Existing ROW
- Proposed Drainage
- Existing Drainage
- Retaining Wall
- Proposed Noise Wall
- \*\*\* Jurisdictional Ditch
- ◇ Proposed Ecology Embankment
- Bridge
- ▨ Proposed Stormwater Facility
- ▨ Existing Stormwater Facility
- ▨ Jurisdictional Area
- Direct Impact Wetland
- Temporary Impact Wetland
- No Impact Wetland
- ▨ Direct Impact Wetland Buffer
- ▨ Temporary Impact Wetland Buffer
- ▨ Indirect Impact Wetland Buffer
- No Impact Wetland Buffer
- ▨ New Impervious Surface
- ▨ Remove Pavement
- ▨ Existing Pavement
- ▨ 100Yr Floodplain
- ▨ Landslide Hazard
- ▨ Erosion Hazard
- ▨ Stream Impact Buffer
- ▨ Vegetation Impact Area
- ⬮ Municipality Boundary



**NO WETLAND IMPACTS**

**I-405, SR520 to SR522**

REFERENCE:  
**200401410**

APPLICANT: WSDOT

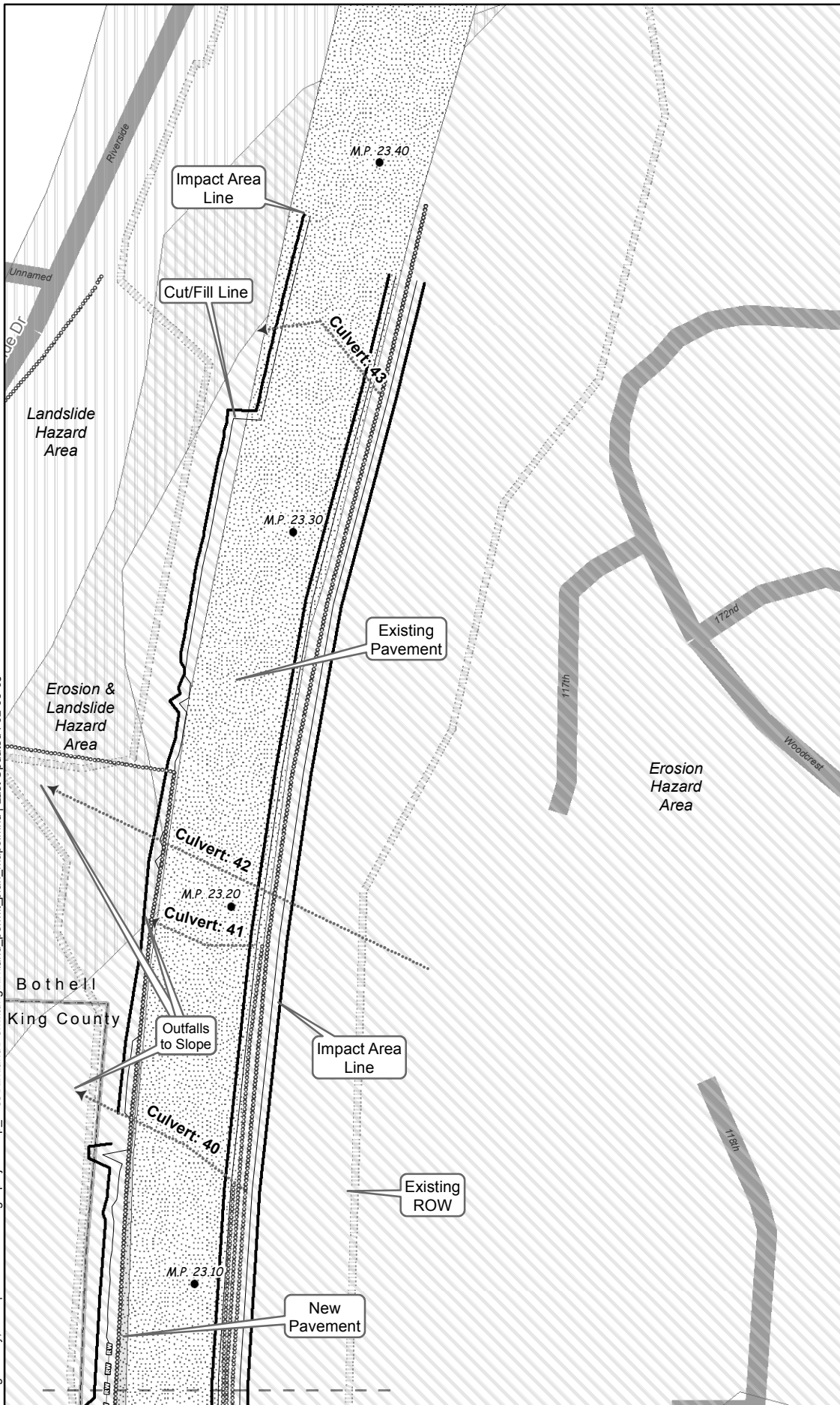
**PURPOSE:** Roadway Improvements  
**PROPOSED/RETAIN:** Fill 1.657 acres of wetlands and other waters of the U.S.  
**IN:** Streams and Wetlands  
**NEAR/AT:** Bothell  
**COUNTY:** King **STATE:** WA  
**DATE:** 02/03/2005



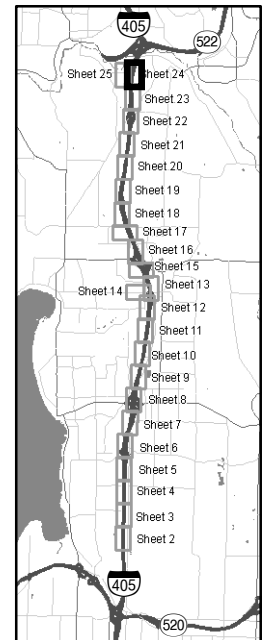
**HORIZONTAL DATUM:** NAD 83/91  
**VERTICAL DATUM:** NAVD88

**SHEET 23 of 53**

Source: WSDOT, 2004. King County, 2004. | I:\SEAW\405\gis\project\map\_docs\Kirkland\Permitting\Kirkland\_permit\_plan\_maps.mxd | Last Updated: 02-08-05



- Legend**
- ▲ Proposed Outfalls
  - Milepost
  - ∧ Cut & Fill
  - ➡ Stream
  - Road
  - ➡ Railroad
  - High Water Mark
  - Cross Section
  - Impact & Temporary Impact Line
  - ||||| Proposed ROW
  - ||||| Existing ROW
  - Proposed Drainage
  - Existing Drainage
  - Retaining Wall
  - Proposed Noise Wall
  - \*\*\* Jurisdictional Ditch
  - ◇◇ Proposed Ecology Embankment
  - Bridge
  - ▨ Proposed Stormwater Facility
  - ▨ Existing Stormwater Facility
  - ▨ Jurisdictional Area
  - Direct Impact Wetland
  - Temporary Impact Wetland
  - No Impact Wetland
  - ▨ Direct Impact Wetland Buffer
  - ▨ Temporary Impact Wetland Buffer
  - ▨ Indirect Impact Wetland Buffer
  - No Impact Wetland Buffer
  - ▨ New Impervious Surface
  - ▨ Remove Pavement
  - ▨ Existing Pavement
  - ▨ 100Yr Floodplain
  - ▨ Landslide Hazard
  - ▨ Erosion Hazard
  - ▨ Stream Impact Buffer
  - ▨ Vegetation Impact Area
  - ▨ Municipality Boundary



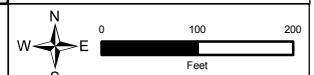
**NO WETLAND IMPACTS**

**I-405, SR520 to SR522**

REFERENCE:  
**200401410**

APPLICANT: WSDOT

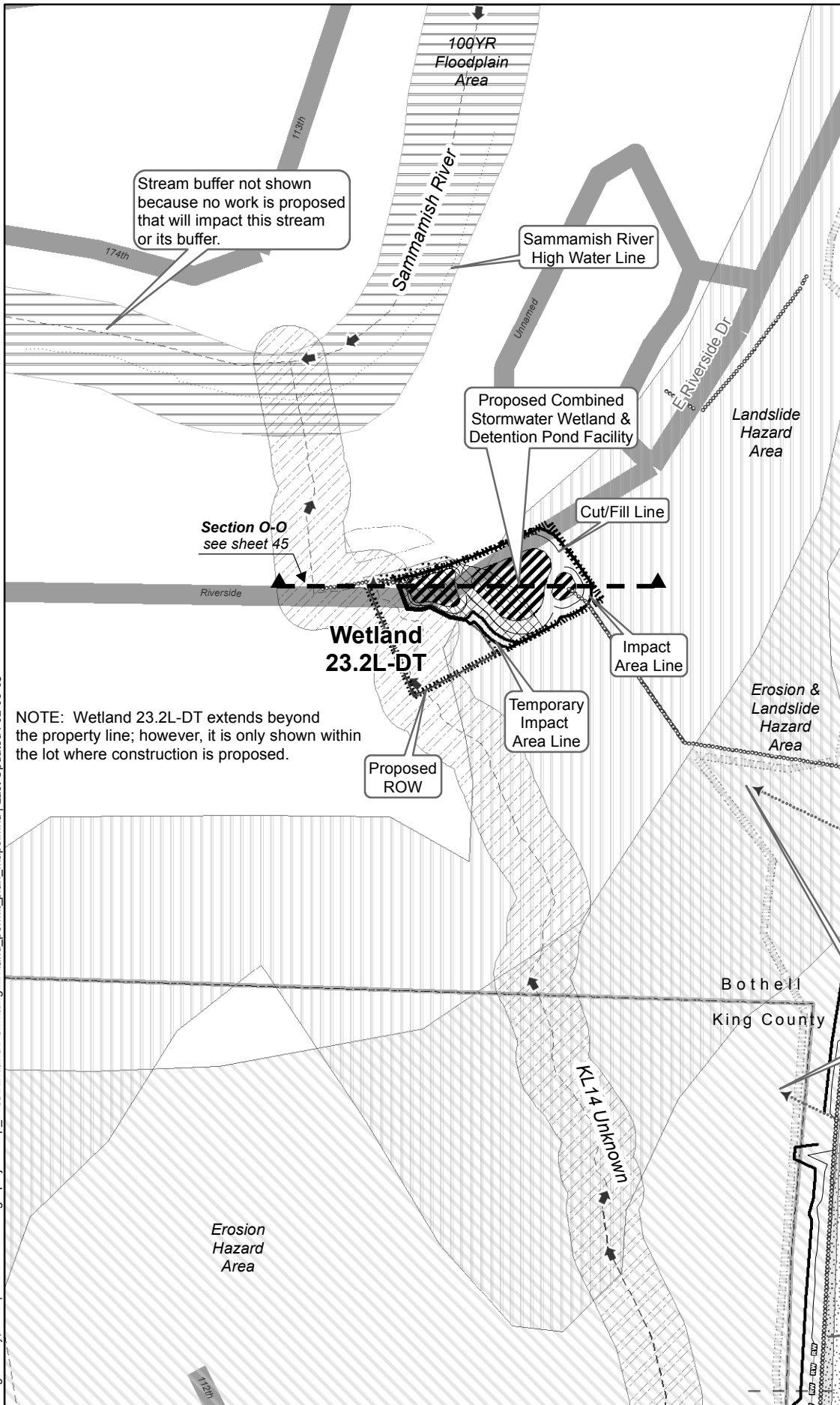
**PURPOSE:** Roadway Improvements  
**PROPOSED/RETAIN:** Fill 1.657 acres of wetlands and other waters of the U.S.  
**IN:** Streams and Wetlands  
**AT:** Bothell  
**COUNTY:** King **STATE:** WA  
**DATE:** 02/03/2005



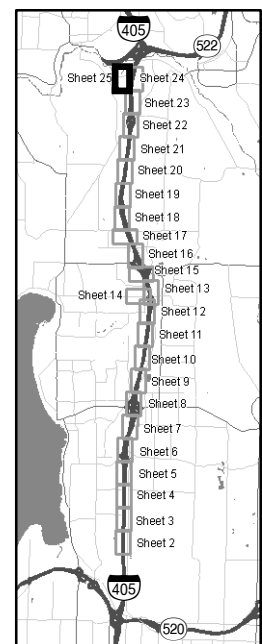
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**VERTICAL DATUM:** NAVD88

**SHEET 24 of 53**

Source: WSDOT, 2004. King County, 2004. I:\SEAW\405\gis\project\map\_docs\Kirkland\Permitting\Kirkland\_permit\_plan\_maps.mxd | Last Updated: 02-08-05



- Legend**
- ▲ Proposed Outfalls
  - Milepost
  - ∧ Cut & Fill
  - ➡ Stream
  - ▬ Road
  - ➡ Railroad
  - ⋯ High Water Mark
  - Cross Section
  - Impact & Temporary Impact Line
  - ||||| Proposed ROW
  - ||||| Existing ROW
  - ⋯ Proposed Drainage
  - ⋯ Existing Drainage
  - ▬ Retaining Wall
  - ⋯ Proposed Noise Wall
  - ✱ Jurisdictional Ditch
  - ◊ Proposed Ecology Embankment
  - Bridge
  - ▨ Proposed Stormwater Facility
  - ▨ Existing Stormwater Facility
  - ▨ Jurisdictional Area
  - ▨ Direct Impact Wetland
  - ▨ Temporary Impact Wetland
  - ▨ No Impact Wetland
  - ▨ Direct Impact Wetland Buffer
  - ▨ Temporary Impact Wetland Buffer
  - ▨ Indirect Impact Wetland Buffer
  - ▨ No Impact Wetland Buffer
  - ▨ New Impervious Surface
  - ▨ Remove Pavement
  - ▨ Existing Pavement
  - ▨ 100Yr Floodplain
  - ▨ Landslide Hazard
  - ▨ Erosion Hazard
  - ▨ Stream Impact Buffer
  - ▨ Vegetation Impact Area
  - ⬢ Municipality Boundary



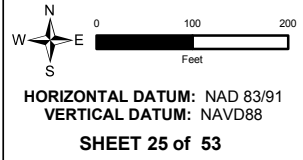
WETLAND IMPACTS (sf)			
Wetland	Temporary	Direct	Indirect
22.8L	4317	5905	0

**I-405, SR520 to SR522**

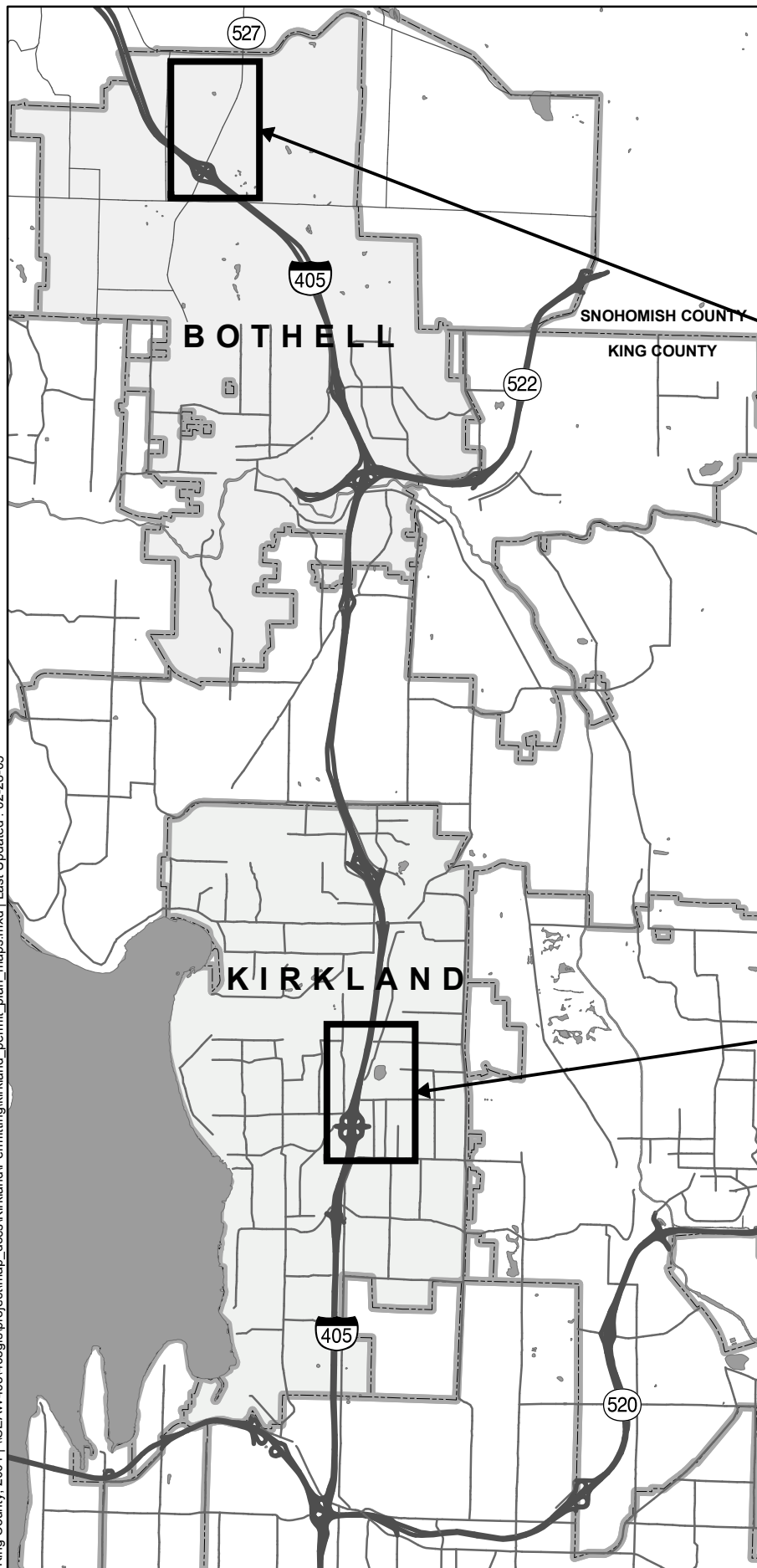
REFERENCE:  
**200401410**

APPLICANT: WSDOT

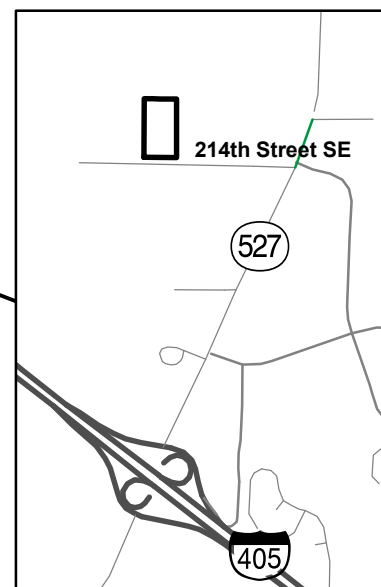
**PURPOSE:** Roadway Improvements  
**PROPOSED/RETAIN:** Fill 1.657 acres of wetlands and other waters of the U.S.  
**IN:** Streams and Wetlands  
**AT:** Bothell  
**COUNTY:** King **STATE:** WA  
**DATE:** 02/03/2005



Source: WSDOT, 2004. King County, 2004. | \\SEAW\405\gis\project\map\_docs\Kirkland\Permitting\Kirkland\_permit\_plan\_maps.mxd | Last Updated : 02-28-05



### THRASHERS MITIGATION SITE



### FORBES LAKE MITIGATION SITES



#### Legend

- Freeway
- Arterial Road
- Local Road
- Mitigation Site
- Municipality
- Waterbody

### MITIGATION SITE VICINITY MAP

**I-405, SR520 to SR522**

REFERENCE:  
**200401410**

APPLICANT: WSDOT

**PURPOSE:** Roadway Improvements  
**PROPOSED/RETAIN:** 2,142 acres of  
impacts to wetlands and other waters of the U.S.  
**IN:** Streams and Wetlands  
**AT:** Kirkland and Bothell  
**COUNTY:** King and Snohomish **STATE:** WA  
**DATE:** 02/28/2005

0 0.5 1  
Miles  
**HORIZONTAL DATUM:** NAD 83/91  
**VERTICAL DATUM:** NAVD88  
**SHEET 54 of 54**



## Appendix A Culverts

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## INTRODUCTION

The I-405, SR520 to SR 522 Project will include several culvert extensions in areas where the road prism will change. Headwalls and retaining features will be used to avoid impacts to stream and riparian habitat features (see Sheets 45, 46, and 47 for typical headwalls and retaining features). Some culverts will be replaced for drainage reasons.

Table A-1 identifies culvert replacements and extensions for the I-405, SR520 to SR 522 Project. The table also indicates impacts associated with streams, riparian areas, and the ordinary high water mark (OHWM). The last column contains descriptions of work, sheet references, information on outfalls, whether or not there is in-water work associated with each culvert, and instances where jurisdictional ditches are impacted by the culvert work.



**Table A-1 Cross Culverts Extensions/Replacements for the I-405, SR520 to SR 522 Project Table 1**

Culvert No.	Culvert Type	Mile Post	Assoc. w/Stream	Perm. Stream Impacts Below OHWM (sf)	Perm. Riparian Impacts (sf)	Temp. Stream Impacts Below OHWM (sf)	Temp. Riparian Impacts (sf)	Area (sf) and Volume (cy) Fill Below OHWM	Area (sf) and Volume (cy) Excavation Below OHWM	Construction Activity
1	Unknown	15.95	N/A							See Permit Plans, Sheets 2 and 27. Replace 190 feet of pipe. The culvert will discharge to a proposed detention pond. Jurisdictional Ditch 1 will be impacted due to road widening. A new ditch will be constructed to the west of the widened roadway. An ecology embankment will be constructed along the western roadway embankment. Outfalls to new piped conveyance system flowing to the new detention pond.
2	18" concrete	16.07	N/A							See Permit Plans, Sheets 2 and 28, and Photo Figures 1, 2, 3 and 4 in Appendix A. Extend culvert approximately 13 feet westward of the roadway. Roadway widening, and subsequent culvert lengthening, will impact Wetland 16.3L. Outfalls to existing conveyance system flowing to Wetland 16.2R on the east side of I-405.
3	18" concrete	16.18	N/A							See Permit Plans, Sheets 2 and 29, and Photo Figures 5, 6 and 7 in Appendix A. Extend culvert approximately 15 feet westward of the roadway. Jurisdictional Ditch 2 will be impacted due to road widening. A new ditch will be constructed to the west of the widened roadway. An ecology embankment will be constructed along the western roadway embankment. Outfalls to existing conveyance system flowing down the slope towards 116 <sup>th</sup> Street on the east side of I-405.
4	18" concrete	16.32	N/A							See Permit Plans, Sheets 3 and 30, and Photo Figures 8, 9 and 10 in Appendix A. Extend culvert 15 feet westward of the roadway. Wetland 16.5L will be a total loss due to road widening. A new ditch will be constructed to the west of the widened roadway. An ecology embankment will be constructed along the western roadway embankment. Outfalls to existing conveyance system flowing down the slope towards 116 <sup>th</sup> Street along the east side of I-405.
5	24" concrete	16.47	C-5	2,040	5,100		3,400	2,040 sf 113 cy		See Permit Plans, Sheets 3 and 31, and Photo Figures 11, 12 and 13 in Appendix A. Extend culvert 15 feet westward of the roadway. This culvert will drain a new ditch to the west of the widened roadway. Stream C-5 runs through this culvert. Inlet protection at the west end of the culvert will impact Stream C-5, which discharges near Yarrow Creek. These impacts are included in the permanent stream impacts below OHWM. Outfalls to existing open ditch, which flows to a piped system, discharging near Yarrow Creek.
6	18" concrete	16.51	N/A							See Sheet 3 and Photo Figures 14, 15. Extend about 15 feet west. Protect the west outfall. Outfalls to existing ditch.

Culvert No.	Culvert Type	Mile Post	Assoc. w/Stream	Perm. Stream Impacts Below OHWM (sf)	Perm. Riparian Impacts (sf)	Temp. Stream Impacts Below OHWM (sf)	Temp. Riparian Impacts (sf)	Area (sf) and Volume (cy) Fill Below OHWM	Area (sf) and Volume (cy) Excavation Below OHWM	Construction Activity
7	Unknown	16.55	N/A							See Sheet 4. Extend approximately 15 feet on west side of I-405. Outfalls to existing ditch.
8	Unknown	16.70	N/A							See Sheets 4 and 30, and Photo Figure 16. Construct detention vault at the outfall.
9	Unknown	17.05	N/A							See Sheet 5. Adjust the catch basin in the median.
10	Unknown	17.23	KL-2							See Sheet 5. Adjust catch basin in the median. Outfalls to Stream KL-2. No in-water work.
11	Unknown	17.32	N/A							See Sheet 6. Adjust west and east catch basins. Outfalls to existing ditch.
12	Unknown	17.54	KL-4							See Sheet 6. Outfalls to Stream KL-4. No in-water work.
13	Unknown	17.58	N/A							See Sheet 6. Outfalls to ditch, which drains to KL-4.
14	Unknown	17.82	N/A							See Sheet 7. Adjust catch basin in the median. Outfalls to existing ditch.
15	Unknown	18.20	N/A							See Sheet 8 and Photo Figure 17. Adjust east catch basin. Outfalls to existing drainage system.
16	12" cmp	18.57	N/A							See Permit Plans, Sheet 9 and Photo Figure 18 in Appendix A. Extend culvert 20 feet westward and 15 feet eastward of the roadway. Ecology embankments will be constructed along both the western and eastern roadway embankments. Outfalls to roadside ditch, which outfalls to Forbes Lake.
17	24" cmp	18.79	N/A							See Sheet 10, and Photo Figures 19 and 20. Extend 22 feet west. Outfalls to a ditch, which drains into the existing piped system, which drains to Stream KL-6. No in-water work.
18	18" cmp	18.96	C-18	12		8	16	12 sf 0.5 cy		See Permit Plans, Sheet 10, and Photo Figures 21, 22 and 23 in Appendix A. Extend culvert 25 westward of the roadway. Install a headwall on the east side of the culvert. Stream C-18 runs through this culvert. Outlet protection at the east end of the culvert will impact Stream C-18, which discharges to Stream KL-5 (Forbes Creek). These impacts are included in the permanent stream impacts below OHWM in Table A-1. Outfalls to Stream C-18. In-water work is unavoidable at this site.

Culvert No.	Culvert Type	Mile Post	Assoc. w/Stream	Perm. Stream Impacts Below OHWM (sf)	Perm. Riparian Impacts (sf)	Temp. Stream Impacts Below OHWM (sf)	Temp. Riparian Impacts (sf)	Area (sf) and Volume (cy) Fill Below OHWM	Area (sf) and Volume (cy) Excavation Below OHWM	Construction Activity
19	24" concrete	19.07	C-19	80	3,000			80 sf 6 cy		See Permit Plans, Sheets 10, 11 and 34, and Photo Figures 24, 25, 26 and 41 in Appendix A. Extend culvert 20 feet westward of the roadway. Stream C-19 runs through this culvert. Inlet protection at the west end of the culvert will impact Stream C-19, which discharges to Stream KL-5 (Forbes Creek). These impacts are included in the permanent stream impacts below OHWM in Table A-1. Outfalls to Stream C-19. In-water work is unavoidable at this site.
20	36" cmp	19.14	KL-5	1,885	6,716	448	26,013	150 sf 30 cy	1,885 sf 250 cy	See Permit Plans, Sheets 11, 49, 50, 51, 52, 53, and Photo Figures 27 and 28 in Appendix A. Retrofit for fish passage will include installation of 450 feet of culvert. Inlet and outlet protection will impact Stream KL-5 (Forbes Creek). These impacts are included in the permanent stream impacts below OHWM. Outfalls through a fishway to Stream KL-5 (Forbes Creek). In-water work is unavoidable at this site. A more detailed description of this retrofit is given near the end of section 7a and in Appendices A and C.
21	24" cmp	19.42	N/A							See Permit Plans, Sheets 11 and 12 and Photo Figures 29 and 30 in Appendix A. Extend culvert 30 feet eastward of the roadway. Install catch basins on both sides of the culvert. Outfalls to new piped conveyance system, which discharges to the new detention vault.
22	24" cmp	19.59	C-22	10		16	96	10 sf 0.5 cy		See Permit Plans, Sheet 12 and Photo Figures 31, 32 and 62 in Appendix A. Replace existing culvert with 292 feet of new culvert nearly perpendicular to the roadway. Wetland 19.3R will be a total loss due to road widening, and the construction of an ecology embankment and Retaining Wall 3020. Install catch basins on both sides of the culvert. The culvert will connect Stream C-22 to the existing conveyance system running south along the west side of the roadway. Inlet protection at the east end of the culvert will impact Stream C-22. These impacts are included in the permanent stream impacts below OHWM. Outfalls to new piped conveyance system discharging to Wetland 19.5L, which outfalls to Stream KL-8.
23	24" DI	19.83	N/A							See Permit Plans, Sheet 13. Replace and upsize a segment of the existing culvert system to 24" diameter pipe. Wetland 19.6R and Jurisdictional Area C will be impacted due to road widening. Additional structures will be placed at the interchange to collect and convey off-site runoff to the new trunk line at 116 <sup>th</sup> . Outfalls to existing piped conveyance system.
24	Two 42"	20.46	N/A							See Sheet 16. Outfalls to Stream KL-5. No in-water work.

Culvert No.	Culvert Type	Mile Post	Assoc. w/Stream	Perm. Stream Impacts Below OHWM (sf)	Perm. Riparian Impacts (sf)	Temp. Stream Impacts Below OHWM (sf)	Temp. Riparian Impacts (sf)	Area (sf) and Volume (cy) Fill Below OHWM	Area (sf) and Volume (cy) Excavation Below OHWM	Construction Activity
25	54" cmp	20.86	KL-12							See Sheet 17. Outfalls to KL-12 (tributary to Juanita Creek). No in-water work.
26	18" concrete	20.97	N/A							See Sheet 18. Outfalls to KL-12 (tributary to Juanita Creek). No in-water work.
27	24" cmp	21.23	N/A							See Permit Plans, Sheet 18 and Photo Figures 33 and 34 in Appendix A. Extend culvert 20 feet eastward into the median. Jurisdictional Ditch 9 will be displaced due to road widening. A new ditch will be constructed to the east of the widened roadway. An ecology embankment will be constructed in the median along the eastern roadway embankment. Outfalls to existing detention pond.
28	30" cmp	21.27	C-28	120	280	300	2,000	120 sf 27 cy	120 sf 9 cy	See Permit Plans, Sheets 18 and 38, and Photo Figures 35, 36, 37, 38, 39, 40 and 44 in Appendix A. Extend culvert 30 feet eastward into the median. Reconstruct the outfall on the west side of the culvert. An ecology embankment will be constructed along the eastern roadway embankment. Stream C-28 runs through this culvert. Inlet protection at the east end of the culvert will impact Stream C-28, a tributary to Juanita Creek. These impacts are included in the permanent stream impacts below OHWM. Outfalls to a tributary to Stream KL-12, a tributary to Juanita Creek. In-water work is unavoidable at this site.
29	30" cmp	21.41	C-29	114		60		114 sf 5 cy		See Permit Plans, Sheets 19 and 39, and Photo Figures 42, 43, 45, 46, and 47 in Appendix A. Extend culvert 35 feet eastward into the median. Jurisdictional Ditch 12 will be displaced due to road widening. A new ditch will be constructed to the east of the widened roadway. An ecology embankment will be constructed along the eastern roadway embankment. Stream C-29 runs through this culvert. Inlet protection at the east end of the culvert will impact Stream C-29, a tributary to Juanita Creek. These impacts are included in the permanent stream impacts below OHWM. Wetland 21.6L will be impacted by alteration of the existing conveyance. This impact has been accounted for in the wetland impact totals, and addressed in the Draft Wetland Mitigation Plan. Outfalls to existing piped conveyance system which drains to Stream KL-12, a tributary to Juanita Creek.
30	18" cmp	21.54	N/A							See Permit Plans, Sheet 19 and Photo Figures 50, 51, and 52 in Appendix A. Jurisdictional Ditch 12 will be displaced due to road widening. The roadway will be widened on both sides; however the culvert currently extends further than the proposed roadway width. Flow patterns within this culvert will remain as is.
31	18" cmp	21.67	N/A							See Sheet 20. Outfalls to ditch, which drains to existing system, which drains to KL-13 (Juanita Creek).

Culvert No.	Culvert Type	Mile Post	Assoc. w/Stream	Perm. Stream Impacts Below OHWM (sf)	Perm. Riparian Impacts (sf)	Temp. Stream Impacts Below OHWM (sf)	Temp. Riparian Impacts (sf)	Area (sf) and Volume (cy) Fill Below OHWM	Area (sf) and Volume (cy) Excavation Below OHWM	Construction Activity
32	48" cmp	21.92	N/A							See Sheet 20 and Photo Figures 48, 49, 53, 54, 55, 56, 57, 58, 59, 60, and 61. Outfalls to KL-13 (Juanita Creek). There will be no in-water work.
33	24" concrete	22.10	N/A							See Sheet 21. Put in retaining wall on west side, and protect west outfall. Outfalls to catch basin and drains to existing piped system.
34	18" concrete	22.28	N/A							See Sheet 21. Extend culvert 72 feet west. Outfalls to existing ditch which drains to Wetland 22.5L.
35	24" concrete	22.60	N/A							See Sheet 22. Replace 152 feet of culvert, and abandon the existing culvert. Outfalls to existing ditch, which drains into an offsite wetland.
36	42" cmp	22.75	N/A							See Sheet 23. Outfalls to Stream KL-14. No in-water work.
37	24" cmp	22.81	N/A							See Sheet 23. Runoff will be collected and drain into bypass system, which will drain into a proposed detention pond. West catch basin will be replaced and a catch basin will be added on the east side. Work on the west side will intersect Jurisdictional Ditch 14 within Wetland 22.8L.
38	18" cmp	22.90	N/A							See Sheet 23. Runoff will be collected and drain into bypass system, which will drain into a proposed detention pond.
39	18" cmp	22.98	KL-14							See Sheet 23. Runoff will be collected and drain into bypass system, which will drain into a proposed detention pond.
40	18" cmp	23.13	N/A							See Sheets 24 and 25. Runoff will be collected into a bypass system, which discharges to Stream KL-14 and then to the Sammamish River.
41	18" cmp	23.18	N/A							See Sheets 24 and 25. Same as No. 40.
42	30" cmp	23.20	N/A							See Sheets 24 and 25. Same as No. 40.
43	24" cmp	23.35	N/A							See Sheets 24 and 25. Install a flow splitter and discharge to two outfalls that drain into the Sammamish River.
TOTAL				4,261	15,096	832	31,525	2,526 sf 182 cy	2,005 259 cy	

## Forbes Creek Culvert Retrofit

Forbes Creek is a tributary to Lake Washington and flows through an existing 42-inch-diameter, 450-foot-long vented corrugated metal pipe under I-405. The culvert was most likely installed during construction of I-405 during the 1950s and 1960s. The pipe inlet projects into the stream and has a rock headwall. The culvert discharges on to an aluminum apron and wingwall system. The downstream creek channel is located approximately 2 feet below the apron, which prevents adequate fish passage.

To correct this problem, a second culvert and a new fishway located at the downstream end of the culvert are proposed to be placed along the south side the existing culvert. The proposed project elements have been designed to meet Washington Department of Fish and Wildlife (WDFW) criteria provided in the 2003 *Design of Road Culverts for Fish Passage* and the 2000 *Fishway Guidelines for Washington State*.

### Proposed Retrofit

The proposed culvert is anticipated to be a 78-inch-diameter, 450-foot-long steel culvert with little slope. The proposed culvert upstream invert is approximately 3 feet lower than the existing upstream invert. The lower elevation accounts for the required 20% of the culvert diameter to be countersunk and ensure that low flows up to 18 cfs are conveyed to the new culvert. The existing culvert will then be used in conjunction with the new culvert to convey flows higher than the high flow fish passage flow (18 cfs).

The fishway comprises thirteen pools with an outlet and overflow pool. Each pool is approximately 8 feet long by 8 feet wide with a minimum 3.4-foot water depth. The fishway is designed for a minimum fish passage flow of 0 cfs and to pass 18 cfs over the entire 8-foot span of the weir with a head of 0.8 feet. High flows above 18 cfs will be passed over a 9-foot-wide broad crested overflow weir located in the culvert outlet pool. A 6-foot-high chain link fence around the fishway is also proposed.

### Maintenance

Inspection of all the pools and the culvert will be required for debris accumulation. During maintenance operations, the knife gate installed in each pool can be opened to allow the draining of that specific pool for maintenance.

Access to the fishway and culvert has been provided to the upstream and downstream locations directly from I-405. The access ways will provide for ingress and egress during the construction and inspection and maintenance after the completion of the project.

### Construction

It is anticipated that the construction of the culvert will be accomplished using jack and bore trenchless technology. In water work will occur within the designated WDFW fish windows.

Prior to construction, the contractor shall install erosion and sediment control measures. Once measures are in place, the contractor will isolate the work area and install a temporary stream bypass. It is anticipated that a sandbag coffer dam or similar structure will be used to isolate the project area. Flows will be diverted above the work area and temporarily routed past the upstream construction area into the existing culvert. A fish screen is required at the upstream end of the diversion. Fish trapped in the isolated reach will be immediately removed. Alternatively, a pump and pressure pipe may be used to divert flows. Additionally, a temporary bypass pipe/coffer dam will be installed at the downstream end of the work area to prevent water from entering the fishway construction and culvert work area.

It is anticipated that dewatering will be necessary for the upstream portion of the project. Turbid water will be treated in either a settling pond or Baker tanks prior to release back into the stream.

As part of the culvert construction, the existing channel will be graded upstream and downstream of the culvert to connect the culvert to the existing channel. This grading will be approximately 40 feet upstream and 80 feet long downstream. The channel bottom will be lined with streambed material and shaped similar to the existing channel bottom. The banks forming the headwall will be protected with angular riprap. The upstream and downstream channels and buffers will be restored and stabilized by planting appropriate species.

The following table is a summary of anticipated temporary and permanent impacts associated with the construction of Forbes Creek culvert and fishway in the stream buffer and below the Ordinary High Water Mark. Impacted areas have been shown in the JARPA plans on sheets 50 and 51.

	Below OHWM Impacts		Stream Buffer Impacts	
	Temporary (sq ft)	Permanent (sq ft)	Temporary (sq ft)	Permanent (sq ft)
Upstream	0	728	10,663	2,538
Downstream	448	1,157	15,350	4,178
Total	448	1,885	26,013	6,716

#### Stream Buffer Impacts

Anticipated permanent impacts to the stream buffer include the widened I-405 roadway, the new access road, headwalls and fishway. Anticipated temporary impacts to the stream buffer include the actual grading associated with the widened roadway, access road, and construction activities such as the launch and receiving pits for the pipe jacking. It is anticipated that the stream buffer areas temporarily impacted will be restored upon completion of construction.

#### Below Ordinary High Water Mark Impacts

Permanent impacts below ordinary high water include the upstream channel grading to divert water from the existing culvert into the new culvert. Downstream permanent impacts below ordinary high water include channel grading to provide a pool to facilitate fish entering the fishway. Anticipated temporary impacts below ordinary high water mark include areas impacted by their proximity to construction activity.

Following completion of the culvert installation and channel excavation to connect the new culvert with the stream channel, the stream barrier will be removed to allow the stream to enter. Opening of the new entrance shall be coordinated to reduce impacts of turbidity on aquatic populations and their habitat. Once the new channel and culvert are functioning properly, the remaining BMPS will be removed. The existing culvert will remain in service to convey a portion of the stream flows above 18 cfs.



**Appendix B**  
**Stormwater**

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## STORMWATER MANAGEMENT

This appendix summarizes the stormwater criteria and design along this section of I-405. For more detailed information, please refer to the Preliminary Hydraulic Report. Note that it is the contractor's responsibility to complete the Final Hydraulic Report, and that this report will not be available during the permitting process.

The stormwater management facilities for the I-405, SR520 to SR522 Project have been designed to comply with the WSDOT 2004 Highway Runoff Manual M31-16, with the pre-existing condition being modeled as forested.

The I-405, SR 520 to SR 522 Project will increase impervious surface areas by 13.56 acres, approximately 5 percent more than current conditions. The project includes construction of a new storm drain system that will collect, treat, and discharge highway runoff from the new impervious surfaces and some replaced pavement areas. The highway runoff will be treated by applying both quality and flow control discharge criteria.

Enhanced water quality treatment will be done by filtering the new pavement runoff through ecology embankments constructed into the widened highway area side slopes, and through an off-corridor constructed wetland facility for the north end of the project (outlets to Sammamish River). Quality treatment will be provided for runoff from 51.73 acres of new and existing pavement, or 322% of the pavement area specified for treatment by criteria.

Infiltration testing indicates that infiltration is not a viable method of discharging stormwater throughout the corridor. It is believed that pockets of well-draining soils in some upland areas may exist along the project limits. However, this will be left to the contractor to re-evaluate specific infiltration options. Thus, flow control to protect downstream resources and existing municipal drain systems is proposed using detention.

Open ponds are the preferred flow-control best management practice, although vaults and under-drain storage will be used where right-of-way is limited. There are 9 ponds and 3 vaults proposed for flow control, with a combined detention volume of 10.14 acres. The major detention facilities shown in the exhibits are summarized below:

Facility I.D.	Milepost	Facility Type	Vol (ac-ft)*	Remarks
A1	15.89	Pond	<b>0.68</b>	Pond is located outside of the stream buffer. Discharges directly to Yarrow Creek
A2	16.71	Vault	<b>0.28</b>	Discharges under the west side sound wall to an existing city drain system.
B4	18.21	Pond	<b>0.23</b>	In the NE quadrant of the 85 <sup>th</sup> St. Interchange. Discharges to existing I-405 drain system, and on through culvert 15.
C1.1	19.10	Pond	<b>1.02</b>	Discharges to existing highway side ditch, ultimately into the Forbes Creek Basin
C1.2	19.40	Vault	<b>4.60</b>	Discharges to an existing industrial park drain system, a tributary to Forbes Creek.
D1	20.16	Pond	<b>0.50</b>	Pond in the SE quadrant of the 124 <sup>th</sup> St. Interchange. Discharges into existing highway ditch that drains into the Juanita Creek basin.
D3/D4	21.20	Expand Pond	<b>0.60</b>	Expansion of existing I-405 detention pond. Discharges through existing drains to a Juanita Creek tributary.
E1	22.00	Pond	<b>0.65</b>	Discharge is by a new buried pipe directly to Juanita Creek.

Facility I.D.	Milepost	Facility Type	Vol (ac-ft)*	Remarks
E2	22.25	Pond	<b>0.76</b>	Pond is located outside wetland 22.5 buffer zone. Discharges to an existing ditch, to the wetland.
F1	22.57	Pond	<b>0.15</b>	Located in the SE quadrant of the 160 <sup>th</sup> St. Interchange. Discharges to existing freeway drain system, and on through culvert 35.
F3/F4	23.25	Comb. Pond	<b>0.67</b>	Combination flow control pond and quality treatment wetland facility, located off-site along Riverside Drive. Discharge to roadside ditch and existing city culvert to the Sammamish River.
<b>Detention Total</b>			<b>10.14</b>	

The proposed project retains much of the existing drainage structures and systems in the I-405, SR520 to SR522 Project area. Open roadside ditches will be used as the preferred conveyance method. Open ditches on the edges of the shoulders will be the preferred collection system where right-of-way and grading conditions allow.

New drainage structures will be added, and existing structures will be removed, in order to incorporate new stormwater management facilities or mitigate existing drainage issues.

#### **Watersheds in the Project Area**

The I-405, SR522 to SR520 Project stretches approximately 7.6 miles from the SR 520 interchange to the SR 522 interchange and spans four primary watershed basins, beginning south to north. They include:

- Lake Washington East-Bellevue North
- Forbes Creek
- Juanita Creek
- Sammamish River

For descriptions of TDAs, drainage features, and other stormwater related issues, please refer to the Preliminary Hydraulic Report.

**Appendix C**  
**Streams and Aquatic Resources**

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## STREAMS AND AQUATIC RESOURCES

There are 18 streams that cross or run parallel to I-405 within 300 feet of the project. These streams have been assigned numbers for study purposes; only four of the streams are named.

There is also a stream located within one of the proposed mitigation sites. North Creek flows through adjacent properties near the Thrashers Corner mitigation site.

Table C-1 below identifies the characteristic uses, temporary and permanent impacts, and proposed mitigation. The impacts in this table describe riparian impacts in square feet. For fill and other stream impacts, refer to Appendix A, Culverts.

**Table C-1. Stream Uses, Impacts, and Mitigation**

Stream	Sheet No.	Characteristic Uses	Temporary Impacts (sf)	Permanent Impacts (sf)	Mitigation
KL-1 (Yarrow Creek)	2 and 3	Historically supported coho salmon and kokanee. Cutthroat trout occur downstream and upstream of I-405	None	None	N/A
C-5	3	None documented	3,400 riparian	7,140 (5,100 riparian; 2,040 below OHWM)	Restore vegetation to temporarily impacted area.
KL-2	5	None documented	None	None	N/A
KL-3	6	Listed on WDFW PHS maps but no fish use is documented	None	None	N/A
KL-4	6	Listed on WDFW PHS maps but no fish use is documented	None	None	N/A
KL-6 (tributary to Forbes Creek)	10	The stream is used by cutthroat trout.	None	None	N/A
C-18	10	No fish use; some aquatic invertebrates	24 (16 riparian; 8 below OHWM)	12 below OHWM	Restore vegetation to temporarily impacted area.
C-19	10 and 11	None documented	None	3,080 (3,000 riparian; 80 below OHWM)	None
KL-5 (Forbes Creek)	11, 16	Historically coho and cutthroat trout used Forbes Creek. Juvenile cutthroat documented upstream and downstream of I-405.	26,461 (26,013 riparian; 448 below OHWM)	8,601 (6,716 riparian; 1,885 below OHWM)	WSDOT proposes to retrofit to eliminate a fish passage barrier at Forbes Creek and that this action is self-mitigating.
KL-8 (possible tributary to KL-5 – Forbes Creek)	12	None documented	None	None	N/A
C-22	12	None documented	112 (96 riparian; 16 below OHWM)	10 below OHWM	Restore vegetation to temporarily impacted area.
KL-12 (tributary to KL-13 Juanita Creek)	17 and 18	Coho salmon uses downstream reaches of the stream 300 to 400 feet downstream of the area surveyed for the Project. Cutthroat trout and other resident fish species are documented to use this stream for over a mile upstream of I-405.	None	None	N/A

Stream	Sheet No.	Characteristic Uses	Temporary Impacts (sf)	Permanent Impacts (sf)	Mitigation
C-28	18	None documented	2,300 (2,000 riparian; 300 below OHWM)	400 (280 riparian; 120 below OHWM)	Restore vegetation to temporarily impacted area.
C-29	19	None documented	60 below OHWM	114 below OHWM	Restore vegetation to temporarily impacted area.
KL-13 (Juanita Creek)	20	Cutthroat trout and coho salmon use this stream. Resident fish use approximately 2,000 feet of stream channel upstream of I-405, and the extent of anadromous fish migration terminates approximately 1,000 feet downstream of the area surveyed for the Discipline Report.	None	None	N/A
KL-14	23 and 25	Functioning fish habitat; fish use has not been documented by WDFW.	None	None	N/A
KL-14N	25	None documented	None	None	N/A
KL-15 (Sammamish River)	25	Fall Chinook salmon, coho salmon, sockeye salmon, and winter steelhead use this river. This river also supports resident cutthroat and rainbow trout and several other resident species, along with largemouth bass.	None	None	N/A
North Creek Mitigation Site (outside project corridor)	NA	Salmonids are reported to use North Creek (needs to be updated)	None	None	This is a mitigation site.

### Fish Passage at Forbes Creek

Please see Appendix A and section 7a of the JARPA for details on the Forbes Creek Culvert Retrofit.

### Bridge Structures

The project's only new bridge structures are for replacement of the I-405 bridges over NE 116th Street and the bridge over the BNSF railroad tracks at NE 116th Street. No in-water work is associated with these bridges. The bridge structures (including the overcrossings) will be supported by underground drilled shafts or piling<sup>1</sup>. In general, drilled shafts are built by drilling soils to the desired circumference and depth, pumping a sealing slurry or water into the hole to maintain the stability of the hole, installing rebar, and filling the hole with the concrete to form the new drilled shaft. Once the required pilings are in place, a footing is built to connect the piling together to form and complete the foundation. Footings are built by excavating soils, placing a concrete form, installing rebar, and filling the form with concrete. After the foundation is built, construction of the above ground columns, pier cap, and girders proceeds. The columns, pier cap, and girders typically consist of cast-in-place type (built on-site using concrete forms) or a combination of cast-in-place and pre-cast (built off-site) components. Construction equipment used for aerial structures includes cranes, pile drivers, drilling rigs and augers, backhoes and excavators, jack hammers, concrete pumping equipment, and slurry processing equipment. All concrete and concrete wash water will be fully contained, properly treated and disposed of in accordance with Washington state law and WSDOT standard specifications. If drilling slurry is used, it will be fully contained and not discharged to any location where it can enter a water of the U.S. or other sensitive resource.

<sup>1</sup> Pile driving was not cleared through the ESA consultation process. If the Design Build firm elects to pile drive, WSDOT would need to reinitiate consultation.

**Appendix D**  
**Wetlands**

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The I-405, SR520 to SR522 project will have the following wetland impacts:

0.191 acres temporary wetland impact (8,324 ft<sup>2</sup>)

1.599 acres direct wetland impact (69,649 ft<sup>2</sup>)

0.018 acres indirect wetland impact (790 ft<sup>2</sup>)

0.409 acres temporary wetland buffer impact (17,811 ft<sup>2</sup>)

2.732 acres direct wetland buffer impact (119,011 ft<sup>2</sup>)

There are 33 wetlands that have been delineated within the project area, listed in Table D-1.

### **Construction**

Permanent impacts to wetlands will occur as a result of filling to widen the road prism.

#### Mitigation Measures

The I-405, SR520 to SR522 mitigation strategy includes the use of guidance by local governments to select projects that provide functions and values that are substantially greater than the wetland being affected. Each project must satisfy the requirements of each jurisdiction to compensate for the respective loss of wetlands within the I-405, SR520 to SR522 Project area.

As a result of this jurisdictional coordination effort, five potential mitigation sites were selected. These mitigation sites are identified in section 7c of this JARPA, and in section 5.0 of the Conceptual Wetland Mitigation Discipline Report., which is included in this submittal package.

The Conceptual Wetland Mitigation Discipline Report discusses the mitigation sequencing and the subsequent unavoidable impacts. Section 7b of this JARPA describes specific actions to avoid and minimize impacts to wetlands. In the event that impact numbers change, those in the Final Wetland Mitigation Discipline Report should be used. This Final Wetland Mitigation Discipline Report will be delivered with the final submittal for this project.

### **Operation**

No operational impacts are anticipated.

**Table D-1. Wetland Uses and Impacts**

Wetland ID No.	Sheet No.	Permanent Wetland Impact (sq. ft)	Indirect/Temporary Wetland Impact <sup>1</sup> (sq. ft)	Permanent Buffer Impact (sq. ft)	Indirect/Temporary Buffer Impact (sq. ft)
16.2R	2	0	0	0	0
16.3L	2	1,360	0	0	0
16.5L	3	2,802	0	0	0
17.1R	6	0	0	0	43
17.3R	6	0	0	0	0
17.7R	7	0	0	0	0
18.0R	7	0	0	45	791
18.05R	8	0	0	0	0
18.06L	8	0	0	0	0
18.1R	8	0	0	0	0
18.15R	8	0	0	0	0
18.2R	8	0	0	0	0
18.3R	8	0	0	0	0
18.4R	9	1,622	0	0	0
19.27R	12	3,418	984	21,558	1,212
19.3R	12	10,823	0	24,209	0
19.5L	12	24,999	0	0	0
19.6R	13	2,216	0	0	0
19.6L	13 & 14	481	0	0	0
19.7R	13	2,778	1,210	12,909	2,852
19.8L	13	0	0	0	1,675
19.9L	15	0	0	0	0
19.9R	15	3,021	790	15,609	3,013
20.0L	16	0	0	0	0
20.34L	16	0	0	0	0
20.35L	16	0	0	0	934
20.4L	16	0	0	0	0
21.6L	19	1,850	479	6,150	1,036
21.7L	19	6,016	1,334	7,280	1,034
21.8L	19	2,358	0	0	0
22.5L	21	0	0	13,400	2,543
22.8L	23	5,905	4,317	6,102	1,564
23.2L-DT	23	0	0	11,749	1,114
Total		69,649	9,114	119,011	17,811

<sup>1</sup> All wetland impacts listed under the column Indirect/Temporary Wetland Impact are temporary impacts from construction (e.g. clearing, site access) except for wetland 19.9R, which has an indirect impact of 790 square feet. This is also noted in section 11G, on page 16 of the JARPA. This indirect impact for this wetland is due to replacement of the rest of the wetland with a stormwater facility, after which, the remaining portion will not be a viable wetland.

**I-405, SR 520 to SR 522  
Kirkland Nickel Project**

# **Wetland/Biology Report**

**Washington State  
Department of Transportation**

**February 2005**



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## Summary

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The Washington State Department of Transportation (WSDOT) is planning construction to improve I-405 between approximately SR 520 in the City of Bellevue and SR 522 in the City of Bothell in King County, Washington (see Figure 1). The improvements will occur between approximately milepost 16 to milepost 23 in King County, Washington. These improvements are hereafter called the Kirkland Nickel Project.

Thirty-three wetlands were delineated by WSDOT. Overall, wetlands in the affected environment are generally degraded with a history of disturbance due to road or interchange construction and past development. The wetlands are grouped into three wetland types: emergent, scrub-shrub, and forested. Emergent wetlands are primarily dominated by nonnative vegetation such as reed canarygrass, bentgrass, Himalayan blackberry, and soft rush. The majority of wetlands in the affected environment are emergent. Scrub-shrub and forested wetlands are characterized by deciduous species such as red alder, willow, and black cottonwood.

Twenty-four wetlands in the Kirkland Nickel Project study area are Category IV wetlands according to the *Revised Washington Department of Ecology Wetlands Rating System*. There are no Category I wetlands in the study area. Two Category II wetlands, and seven Category III wetlands occur within the study area.

Construction would result in the loss (filling) or temporarily disturbing an estimated 1.808 acres of wetland. Of this total, approximately 1.599 acres would be permanently filled and 0.191 acres would be temporarily disturbed during construction and subsequently restored. Another 0.018 acres of wetland would be indirectly impacted. Temporary construction impacts may include sediment transport and erosion from disturbed soils onsite due to construction activities. Indirect wetland impacts would occur where most of the existing wetland area would be permanently filled such that the remainder was not likely to function at the same levels as occurred prior to construction.

During the preliminary design process, WSDOT made several adjustments to avoid or minimize impacts to wetlands and their buffers. The most common avoidance and minimization measures included moving stormwater facilities and requiring retaining walls to reduce the extent of fill necessary to construct the road improvements.

WSDOT proposes several measures to compensate for impacted wetland functions and values using a combination of wetland creation and enhancement of existing degraded wetlands at one or more off-site locations. To compensate for the reduction of water quality and water quality functions provided by the impacted wetlands, WSDOT will also implement drainage system improvements to provide stormwater treatment and detention within each basin.

During project-level design, WSDOT will identify specific best management practices (BMPs) and other measures to be incorporated into construction specifications developed during the final design process. BMPs will be implemented during construction and operation of the project to minimize sedimentation and/or contamination of wetlands.

Prior to final development of project-specific BMPs, WSDOT will meet with federal, state, and local agencies to identify mitigation priorities and options for avoiding or minimizing wetland losses, and to compensate for any losses. In accordance with Council on Environmental Quality (CEQ) regulations pertaining to mitigation, BMPs sequencing includes:

1. Avoidance measures that eliminate the onset of impacts
2. Minimization measures proposed to decrease the magnitude or severity of the impact
3. Rectification measures that are part of the project and repair or restore resources
4. Reduction or eliminating measures that soften the impacts
5. Compensation measures designed to offset unavoidable adverse impacts
6. Monitoring measures that become part of the project to ensure that resources are not further degraded by the project

# 1.0 Introduction

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## 1.1 Purpose and Goals

This Wetland/Biology Report has been prepared to meet requirements for wetland assessment outlined in the Washington State Department of Transportation (WSDOT) *Environmental Procedures Manual* (WSDOT, 2004a). This Wetland/Biology Report has been prepared to support environmental documentation and permitting for the Kirkland Nickel Project. Project biologists completed wetland investigations and prepared this report. The objectives of the wetland study include:

- Determine the location and condition of wetlands within the study area
- Evaluate project-related effects
- Outline appropriate measures for project planning and to help the project team meet federal, state, and local regulatory requirements.

## 1.2 Project Description

For the I-405, SR 520 to SR 522 - Kirkland Nickel Project, WSDOT is planning construction to improve I-405 between approximately SR 520 in the City of Bellevue and State Route (SR) 522 in the City of Bothell in King County, Washington. These improvements are hereafter called the Kirkland Nickel Project. The Kirkland Nickel Project improvement area encompasses approximately 7.6 miles from the north side of the I-405 and SR 520 interchange and extends northward to the south side of the I-405 and SR 522 interchange. Principal features of the Kirkland Nickel Project are:

- Roadway construction to add a northbound general-purpose lane from the I-405 and NE 70th Street interchange to the I-405 and NE 124th Street interchange
- Roadway construction to add a southbound general-purpose lane from the I-405 and SR 522 interchange to the I-405 and SR 520 interchange
- Reconstruction, realignment, and reconfiguration of the I-405 and NE 116th Street interchange
- Changes to local roadways for interchange improvements
- Stormwater management to provide runoff detention, water quality treatment, and conveyance system upgrades
- Context Sensitive Solutions (CSS), which incorporates the elements of mobility, safety, environment, and aesthetics throughout the project
- Project measures to avoid or minimize impacts or to compensate for unavoidable impacts to natural resources

### 1.2.1 Stormwater Management

This summary defines the various methods that will be used to ensure water quality issues pertaining to this project are developed in accordance with the WSDOT *Highway Runoff Manual* (WSDOT, 2004b) and WSDOT *Hydraulics Manual* (WSDOT, 2004c). Site-specific stormwater management plans will be developed by the design builder during the final design phase of the project.

## 1.2.2 Present Drainage

The Kirkland Project spans four primary watersheds, listed south to north, as follows:

- Lake Washington East/Bellevue North
- Forbes Creek
- Juanita Creek
- Sammamish River

Within the I-405 Corridor, these watershed basins are comprised of six sub-basins delineated by high and low points along the corridor profile. These sub-basins encompass a total area of approximately 556 acres. These six sub-basins are further broken into 18 Threshold Discharge Areas (TDAs), which are defined as onsite areas draining to a single natural discharge location within 0.25 miles downstream of I-405. The TDAs are associated with the various cross-drains and outfalls along the corridor. The design team used TDAs as basic geographic units for application of stormwater treatment measures to maintain existing drainage patterns.

## 1.2.3 Planned Drainage

### Stormwater Design Standards

The stormwater management facilities for the Kirkland Nickel Project have been designed to comply with the *Highway Runoff Manual* (WSDOT, 2004b) and the *Hydraulics Manual* (WSDOT, 2004c). In most cases, water quality treatment is required for 100 percent of new impervious surfaces along with detention of the two-year through 50-year storms.

Stormwater runoff treatment for both quantity and quality will be provided through use of best management practices (BMPs) in accordance with the *WSDOT Highway Runoff Manual* or through ongoing efforts to identify and develop watershed characterization and improvement opportunities within the Kirkland Nickel Project study area.

### Stormwater Management Facilities

The Kirkland Nickel Project will increase impervious surface areas by 16.11 acres, approximately 5 percent more than current conditions. The Kirkland Nickel includes construction of a new storm drain system that will collect, treat, and discharge highway runoff from the new impervious surfaces and some replaced pavement areas. The highway runoff will be treated by applying both quality and flow-control BMPs in such a manner that the stormwater discharges from the highway will meet water quality and peak discharge criteria required by state and local authorities. A summary of the flow control and water quality treatment facilities currently proposed with the conceptual design is provided in Tables 1-1 and 1-2, respectively.

**Table 1-1: Proposed Flow Control Facilities for Kirkland Nickel Project**

Approximate MP	Contributing Effective Impervious Surface Area (acres)	Facility Type	Area (square feet)	Detention Depth (feet)	Detention Volume (acre-feet)
15.89	1.08	Pond	8,433	5.0	0.68
16.71	0.44	Vault	2,405	5.0	0.28

Approximate MP	Contributing Effective Impervious Surface Area (acres)	Facility Type	Area (square feet)	Detention Depth (feet)	Detention Volume (acre-feet)
18.21	0.35	Pond	3,873	4.0	0.23
19.10	1.66	Pond	12,008	5.0	1.02
19.40	7.95	Vaults	20,032	10.0	4.60
20.16	0.75	Pond	8,712	2.5	0.50
21.20	1.00	Pond Expansion	6,534	4.0	0.60
22.00	0.83	Pond	11,352	3.0	0.65
22.25	0.97	Pond	13,046	3.0	0.76
22.57	0.23	Pond	2,736	4.0	0.15
23.25 <sup>1</sup>	0.79	Combined Pond	3,695	4.5	0.23

**Table 1-2: Proposed Water Quality Treatment Facilities for Kirkland Nickel Project**

Approximate MP	Contributing Effective Impervious Surface Area (acre)	Facility Type	Facility Length (feet)	Facility Area (square feet)
15.89 to 16.22	1.11	Ecology Embankment	1,755	5,750
16.28 to 16.57	0.97	Ecology Embankment	1,541	6,164
16.57 to 16.69	0.73	Ecology Embankment	633	2,532
16.83 to 16.84	0.66	Ecology Embankment	579	2,300
18.16 to 18.25	1.28	Ecology Embankment	466	1,864
18.34 to 18.58	1.74	Ecology Embankment	1,245	4,980
18.58 to 19.36	8.23	Ecology Embankment	4,111	16,444
19.10 to 19.67	4.24	Ecology Embankment	2,584	10,336
19.85 to 19.90	3.69	Ecology Embankment	490	2,450
21.06 to 21.40	3.50	Ecology Embankment	1,790	7,160
21.41 to 21.56	1.85	Ecology Embankment	1,533	6,132

Approximate MP	Contributing Effective Impervious Surface Area (acre)	Facility Type	Facility Length (feet)	Facility Area (square feet)
21.48 to 21.77	1.27	Ecology Embankment	815	3,260
21.77 to 22.18	2.99	Ecology Embankment	2,080	8,320
22.18 to 22.46	2.41	Ecology Embankment	1,496	5,984
22.31 to 22.48	1.60	Ecology Embankment	900	3,600
22.48 to 22.60	1.48	Ecology Embankment	1,204	4,814
23.25	13.98	Combined Stormwater Treatment Wetland/ Detention Pond	NA	5,073

### Stormwater Flow Control

Detention will be provided in accordance with the *WSDOT Highway Runoff Manual* in the form of detention/retention ponds and detention vaults. Infiltration will be used where it is cost-effective and technically feasible to discharge stormwater or otherwise reduce flow control treatment volumes.

Current information about surrounding soils and geologic formations indicates that infiltration is not a viable method of discharging stormwater in most of the project area. However, it is believed that pockets of well-draining soils in some upland areas may exist along the corridor. To evaluate infiltration potential within the Kirkland Nickel Project study area, geotechnical borings will be needed to evaluate depth to groundwater and the permeability of sub-soils. Testing is currently being conducted to identify areas where infiltration may be technically feasible per project design standards.

### Water Quality Treatment Facilities

The Kirkland Nickel project will provide enhanced water quality treatment for all new pavement areas. In addition, 35.62 acres of presently untreated impervious surface will be retrofitted for enhanced water quality treatment. In total, the project will treat 51.73 acres of impervious surface, or 321 percent of the new impervious surfaces to be created by the project. These improvements will be provided in accordance with the *WSDOT Highway Runoff Manual* in the form of combined treatment systems, ecology embankments, and constructed stormwater treatment wetlands. Ecology embankments are the preferred method of treatment because of their flexibility in construction, enhanced treatment capabilities, and relatively low cost.

Ecology embankments are applications of Limited Impacted Development (LID) technologies that provide enhanced water quality treatment. The project will typically use LID BMPs where cost-effective and technically feasible. LID systems provide simpler and less expensive-to-install facilities that generally use both media and biofiltration processes combined with direct infiltration for discharge. While not feasible at all locations along the corridor, LIDs better replicate natural conditions for runoff

treatment and flow control. Stormwater management facilities will also include spill control measures to prevent damage to the proposed transportation facilities and adjacent properties.

### Drainage Collection and Conveyance

Existing drainage structures and systems will be retained in places where they will not be disturbed by new construction. Where space and structure access make it possible, open roadside ditches will be used as the preferred conveyance method. Open ditches on the edges of the shoulders will be the preferred collection system where right-of-way and grading conditions allow.

New drainage structures will be added and existing structures will be removed in order to incorporate new stormwater management facilities, or mitigate existing drainage issues. Generally, proposed collection and conveyance systems will consist of standard WSDOT catch basin and manhole structures connected by lateral and trunk drains to the treatment and flow control facilities. Pipe sizes will generally range from 12 to 30 inches in diameter and be installed on grades and at depths necessary for proper vertical clearances and hydraulic performance. Inlets are placed at locations necessary to limit the spread of design flows into the travel lanes, as required by the *WSDOT Hydraulics Manual* (2004c).

### Culverts

WSDOT anticipates that improvements to the freeway mainline and associated interchanges will impact some existing cross-culverts. Each impacted culvert will be checked with WSDOT maintenance personnel to evaluate the proposed improvements and address any maintenance concerns. Table 1-3 provides information about cross-culverts that may be impacted by the new roadway improvements. Associated culvert improvements include lengthening, placement and connection to new drainage structures, end treatment stabilization, and replacement.

Culvert extensions will be added to existing drainage culverts in areas where the grading limits to accommodate the new roadway widen. These extensions will be added at either the upstream or the downstream end, depending on which end is affected by the grading limits change. Each potential culvert extension was reviewed for potential impacts to stream areas. In locations where potential impacts were identified, construction of headwalls (retaining walls around culverts) or other retaining features have been specified to avoid the need for culvert extensions. A new structure providing fish passage under I-405 and carrying normal stream flows will be constructed at Forbes Creek, while the existing culvert (or a similarly-sized replacement) will be used to pass stream high flows.

**Table 1-3: Proposed Construction at Cross-Culverts**

<b>Culvert ID</b>	<b>Culvert Size</b>	<b>Mile post</b>	<b>Direction Affected</b>	<b>Construction Activity</b>
1	Unknown	15.95	Southbound	Replace 190 ft. culvert, add catch basins
2	18"	16.07	Southbound	Extend west approx. 13 ft., add catch basin
3	18"	16.18	Southbound	Extend west approx. 15 ft., add catch basin
4	18"	16.32	Southbound	Extend west approx. 13 ft., add catch basin
5	24"	16.47	Southbound	Extend west approx. 15 ft., add catch basin
6	18"	16.51	Southbound	Extend west approx. 16 ft., add catch basin
7	Unknown	16.55	Southbound	Extend west approx. 16 ft., add catch basin
8	Unknown	16.70	Southbound	Construct detention vault on west side
16	12"	18.57	Both	Extend west approx. 20 ft., east 15 ft., construct headwall on east side
17	24"	18.79	Southbound	Extend west approx. 22 ft., add catch basin
18	18"	18.96	Southbound	Extend west approx. 25 ft., add catch basin, headwall on east side
19	24"	19.07	Southbound	Extend west approx. 20 ft.
20	30"	19.14	Both	Construct new Forbes Creek fish passage culvert 490 ft. long
21	24"	19.42	Both	Extend east approx. 30 ft., add catch basins
22	24"	19.59	Southbound	Replace 300 ft. culvert, add catch basins
23	24"	19.83	Neither	Replace collection system in NE 116th Street
27	24"	21.23	Southbound	Extend approx. 20 ft. into median, add catch basin
28	30"	21.27	Southbound	Extend approx. 30 ft. into median, replace outfall on west side
29	30"	21.41	Southbound	Extend approx. 35 ft. into median, replace catch basin
30	18"	21.54	Neither	Adjust catch basin in median
34	18"	22.28	Southbound	Extend west approx. 72 ft, add catch basins
35	24"	22.60	Neither	Replace damaged culvert (approx. 152 ft.)
37	24"	22.84	Northbound	Construct collection system and catch basins in shoulder
38	18"	22.90	Northbound	Construct collection system and catch basins in shoulder
39	18"	22.98	Northbound	Construct collection system and catch basins in shoulder
40	18"	23.13	Northbound	Construct collection system and catch basins in shoulder
41	18"	23.18	Both	Construct collection system and catch basins in shoulder
43	24"	23.35	Neither	Construct collection system and catch basins in shoulder with flow splitter

## **1.2.4 Temporary Erosion and Sediment Control Plan (TESCP)**

### **Inspection**

All on-site temporary erosion and sediment control measures will be inspected at least every seven days and within 24-hours after any storm event of greater than 0.5 inch of rain per 24-hour period. An inspection file will be maintained and kept on file at the design-build contractor's office.

### **Permanent Stabilization**

Existing vegetation will be preserved where possible within the project limits. The primary objectives will be the restoration and reseeding of native vegetation and to provide immediate slope stability and erosion control. All temporary erosion and sediment control BMPs will be removed within 30 days after final site stabilization, or after the facilities are no longer needed. Trapped sediments will be removed or stabilized on site.



## 2.0 Methods

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This section describes the methodology used for preparing this Wetland/Biology Report, including the review of existing information and field investigation procedures. These methods are consistent with current federal, WSDOT, and other state agency requirements.

### 2.1 Wetland Identification, Delineation, and Classification

Wetlands were delineated using the Routine Determination Method outlined in the *Washington State Wetland Identification and Delineation Manual* (Ecology, 1997). Wetlands were then classified according to the U.S. Fish and Wildlife Service (USFWS) classification system (Cowardin et al., 1979). Common names are used throughout this report. A list of corresponding taxonomic names are provided in Appendix A. and rated using the *Washington State Wetland Rating System for Western Washington, Revised* developed by the Washington State Department of Ecology (Ecology) (Hruby, 2004). Wetlands were also rated according to the local jurisdiction's sensitive or critical areas ordinance (Table 2-1). All wetlands located in the WSDOT right-of-way (ROW) in the study area were delineated and classified. In general, wetland delineation consisted of three main tasks: (1) assessing vegetation, soil, and hydrologic characteristics to identify areas meeting the wetland identification criteria, (2) evaluating constructed drainage features to determine if they would be regulated as wetlands, and (3) marking wetland boundaries.

### 2.2 Wetland Functional Assessment

Wetlands perform a variety of biological, physical (hydrologic), and chemical (water quality) functions. For this project, wetland functions were evaluated using the WSDOT *Wetland Functions Characterization Tool for Linear Projects* manual (Null et al., 2000) and were assessed based on best professional judgment. The manual is a qualitative tool designed for linear projects to enable the rapid documentation and characterization of the functions provided by a given wetland. The methodology does not assign quantitative values to a particular function, but identifies functional strengths and weaknesses to help guide management decisions and aid in mitigation choices. Wetland functions are divided into the following 14 categories: flood flow alteration, sediment removal, nutrient and toxicant removal, erosion control and shoreline stabilization, production of organic matter and its export, general habitat suitability, habitat for aquatic invertebrates, habitat for amphibians, habitat for wetland-associated mammals, habitat for wetland-associated birds, general fish habitat, native plant richness, educational or scientific value, and uniqueness and heritage.

## 2.3 Agency Coordination and Field Review of Information

The following data sources were reviewed for information on vegetation patterns, topography, drainage, and potential or known wetlands or wildlife habitats in the project vicinity:

- National Wetland Inventory (NWI) Maps
- US Geological Survey 1:24,000 Topographic Maps
- Natural Resources Conservation Service (NRCS) soils surveys and county Hydric soils lists
- City of Kirkland orthophoto topographic map set (1985)
- King County Sensitive Areas Map Folio (King County, 1990)
- *Kirkland's Streams, Wetlands and Wildlife Inventory* (The Watershed Company, 1988)
- *City of Bothell Comprehensive Plan* (City of Bothell, 1997)
- Correspondence with Services: USFWS, NOAA Fisheries Service, Washington Department of Fish and Wildlife (WDFW), and Washington Department of Natural Resources (WDNR).

**Table 2-1: Summary of Agency Coordination for I-405 Kirkland Nickel Project**

Local Jurisdiction	Wetland Regulations	Wetland Rating System	Wetland Inventory
City of Kirkland	Yes	City has 3-tier rating system	<i>Kirkland's Streams, Wetlands and Wildlife Study</i> (The Watershed Company, 1998)
City of Bothell	Yes	City has 3-tier rating system	<i>City of Bothell Comprehensive Plan</i> (City of Bothell, 1997)
King County	Yes	4 –tier rating system	<i>King County Sensitive Areas Map Folio</i> (King County, 1990)

“Yes” indicates jurisdiction has a critical or sensitive areas ordinance that specifically applies to wetlands.

Wetlands and associated buffers are regulated by the local jurisdiction. For the Kirkland Nickel Project, the local jurisdictions include the cities of Kirkland and Bothell, as well as King County. Project biologists rated the wetlands identified in the Kirkland Nickel study area based on the pertinent city or county code, which then determined wetland buffer widths and mitigation ratios. Wetland buffers are vegetated upland areas immediately adjacent to wetlands that protect the many functions and values of wetlands. Scientific literature indicates that buffer widths are directly related to the degree of protection for a particular function. The following sections extract wetland information contained in the sensitive areas ordinances of King County, Kirkland, and Bothell. The full text of each code should be consulted during application of the regulations.

## City of Kirkland

Chapter 90: Drainage Basins of the *City of Kirkland Zoning Code* (KZC) classifies wetlands into three types:

Type 1 wetlands meet any of the following conditions:

- Are contiguous to Lake Washington
- Contain at least one-quarter acre of organic soils, such as peat bogs or mucky soils
- Are equal to or greater than 10 acres in size and having three or more wetland classes, as defined by the US Fish & Wildlife Service (Cowardin et al., 1979), one of which is open water
- Have significant habitat value to state or federally listed threatened or endangered wildlife species
- Contain state or federally listed threatened or endangered plant species.

Type 2 wetlands fail to meet any of the criteria for Type 1 Wetlands, yet provide significant habitat function and value, and merit at least 22 points as determined by using the City's Wetland Field Data Form, which is Plate 26 of Chapter 180 KZC.

Type 3 wetlands fail meet the criteria for either Type 1 or Type 2 wetlands and merit fewer than 22 points as determined by using the City's Wetland Field Data Form, which is Plate 26 of Chapter 180 KZC.

According to the KZC 90.45, buffers from the wetland edge are required (see Table 2-2), and structures shall be set back a minimum of 10 feet from the designated or modified wetland buffer (KZC 90.45 [2]). Impacts to wetlands are to be mitigated according to the provisions under KZC 90.55 Wetland Modification. Section 4D of that statute states that "All approved impacts to regulated wetlands require compensatory mitigation in order to achieve the goal of no net loss of wetland function, value, and acreage. Mitigation shall be implemented through the creation of wetlands (from non-wetland areas) or through the restoration of wetlands (from uplands that were formerly wetlands).

**Table 2-2: City of Kirkland Wetland Regulations**

Wetland Classification	Buffer Requirement	
	Primary Basin	Secondary Basin
Type 1	100 feet	75 feet
Type 2	75 feet	50 feet
Type 3	50 feet	25 feet

## City of Bothell

The Bothell Municipal Code (BMC) Chapter 14 classifies wetlands into three types, as follows:

Category 1 wetlands meet any of the following criteria:

- Contain species listed by the federal government or the state of Washington as endangered, threatened, sensitive, or priority, or the presence of essential or outstanding actual habitat for those species

- Have 40 to 60 percent permanent open water in dispersed patches with two or more classes of vegetation
- Are equal to or greater than 10 acres in size and having three or more wetland classes, one of which is open water
- Contain plant associations of infrequent occurrence.

Category 2 wetlands meet any of the following criteria:

- Are greater than one acre in size
- Are equal to or less than one acre in size and have three or more wetland classes
- Are equal to or less than one acre and has a forested wetland class
- Contain heron rookeries or raptor nesting trees.

Category 3 wetlands are equal to or less than one acre in size and have two or fewer wetland classes.

Bothell Municipal Code 14.04.200C defines wetland buffers as designated areas adjacent to and an integral part of a wetland ecosystem. Buffers ideally provide a transition between the natural wetland system and adjacent development or activity in order to protect a wetland from adverse impacts to its functions and values from said development or activity. All buffers are measured from the wetland edge as delineated in the field and are sized depending on the wetland category (see Table 2-3).

In accordance with BMC 14.04.150, any adverse effects from alterations to wetlands and their buffers shall be mitigated through restoration, creation, and/or enhancement. Mitigation actions shall result in no net loss of wetland area except when the lost wetland area provides minimal functions and the mitigation action(s) will clearly result in equal or greater wetland hydrologic and biologic functions, as determined by a site-specific function assessment. Such mitigation action(s) shall provide similar wetland functions to those lost, including those functions shown to be limiting within a watershed through a formal watershed assessment plan or protocol.

**Table 2-3: City of Bothell Wetland Regulations**

Wetland Classification	Buffer Requirement
Category 1	100 feet
Category 2	75 feet
Category 3	50 feet

## King County

- The King County Critical Areas Ordinance classifies wetlands into four categories (category I, category II, category III, and category IV) based on the *Washington State Wetland Rating System for Western Washington - Revised* (Hruby, 2004)

According to the King County critical areas ordinance, wetland buffers shall be established from the wetland edge as summarized in Table 2-4.

**Table 2-4: King County Wetland Buffer Requirements**

Type	Buffer
<b>Category I</b>	
Natural Heritage Wetlands	215 feet
Bog	215 feet
Estuarine	175 feet
Coastal Lagoon	175 feet
Habitat score from 29 to 36 points	225 feet
Habitat score from 20 to 28 points	150 feet
Category I wetlands not meeting any of the criteria below	125 feet
<b>Category II</b>	
Estuarine	135 feet
Habitat score from 29 to 36 points	200 feet
Habitat score from 20 to 28 points	125 feet
Category II wetlands not meeting any of the criteria below	100 feet
<b>Category III</b>	
Habitat score from 20 to 28 points	125 feet
Category III wetlands not meeting any of the criteria below	75 feet
<b>Category IV</b>	
	50 feet

## 2.4 Threatened and Endangered Species

Information on threatened and endangered species (TES) species and priority habitats potentially occurring in the project area was obtained from the WDNR Natural Heritage Program, the WDFW Priority Habitats and Species Program, the USFWS, and the NOAA Fisheries databases. This information was used in conjunction with the wildlife and habitat observations to generally assess the potential presence of protected species/habitats in the project area. However, a separate Biological Assessment (BA) process has specifically evaluated the project area for the presence of TES species or their suitable habitat (WSDOT, 2004d). Potential impacts to TES plant, wildlife, and fish species, as a result of construction and operation of the proposed project, are identified in that BA (WSDOT, 2004d).



### 3.0 Affected Environment

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The following sections describe existing environmental information for the project vicinity and the findings of the wetland determinations made in the field. Wetland ratings established by state and local jurisdictions, wetland classifications, wetland functions and values, and wetland proximity to streams are also described below.

The NWI (USFWS, 1987 and 1988) and *King County Sensitive Areas Map Folio* (King County, 1990) contain few mapped wetlands in the study area. Palustrine forested (PFO) and palustrine emergent (PEM) wetlands identified in these documents are associated with the Totem Lake area, Yarrow Creek, and the Sammamish River. These resources also contain maps of a few smaller palustrine scrub-shrub (PSS) and/or PEM wetlands.

The WDFW Priority Habitats and Species database identifies the wetlands mapped near Totem Lake as priority habitat (WDFW, 2003), which project biologists delineated. All other priority wetland habitats identified in the vicinity are located outside of the study area. These include wetlands associated with Lake Washington, Forbes Lake, and the Forbes Creek riparian area in the southern half of the study area and wetlands draining to the Sammamish Slough in the northern end of the study area.

Wetlands identified in the *Kirkland's Streams, Wetlands and Wildlife Study* (The Watershed Company, 1998) replicate those reported in the NWI and WDFW Priority Habitats database. The following mapped wetlands occur primarily outside of the WSDOT right-of-way:

- A wetland area near Yarrow Creek, close to the southern project boundary, and east of a concrete noise wall near milepost (MP) 16.
- Two wetlands south of the NE 116th Street interchange exit between MP 19.3 and 19.5, with small portions extending over the right-of-way boundary. Project biologists identified and delineated both wetlands.
- A large wetland in the Totem Lake area west of I-405 that connects via a culvert beneath 116th Avenue NE to a larger forested wetland near MP 19.7. Project biologists assessed the portion of the wetland within the WSDOT right-of-way.
- The remaining wetlands identified in the *Kirkland's Streams, Wetlands and Wildlife Study* (The Watershed Company, 1998) are outside of the study area.

The *City of Bothell Comprehensive Plan* (City of Bothell, 1997) contains critical areas maps, including wetlands and watershed boundaries. The northern mile of the project area lies within the Bothell city boundaries and contains two large mapped wetlands associated with the Sammamish River and Juanita Creek, which are outside the WSDOT right-of-way.

The US Soil Conservation Service, now named the NRCS, has identified six soil units in the study area (Snyder et al., 1973). Seattle muck is the only unit classified as a hydric soil (NRCS, 1995). The other soil units are Alderwood gravelly sandy loam, Everett gravelly sandy loam, Kitsap silt loam, Ragnar fine sandy loam, and Urban land. Although these five soil units are not classified as hydric soils, they may contain hydric soil inclusions.

### 3.1 Project Area Setting

The vicinity topography is typically lowland areas adjacent to Lake Washington. The majority of the project area is located within the Kirkland city limits. The northern portion of the project extends into the city of Bothell and King County. The majority of the project area where road improvements will occur is WSDOT right-of-way, with small portions in city or county ownership or private ownership.

The entire project lies within the western hemlock vegetation zone of western Washington (Franklin and Dyrness, 1988). Vegetation is dominated by needle-leaved, evergreen tree species such as Douglas-fir, western hemlock, and western red cedar. Other dominant tree species include red alder and big-leaf maple, which occur in scattered patches of deciduous forest habitats in the vicinity of the project.

Uplands in the project vicinity consist of areas adjacent to the existing roadway, residential properties, and disturbed areas. Vegetation in the right-of-way upland areas includes species typically associated with disturbance and past land-clearing activities. These areas have been colonized by Himalayan blackberry, bentgrass, fescue, quackgrass, and many other weeds. Undisturbed uplands include landscaped residential areas or mixed deciduous forest dominated by big-leaf maple, black cottonwood, Douglas-fir, and red alder. Dominant native understory shrubs include snowberry, Indian-plum, and beaked hazelnut. Upland soils in the study area have been intensively disturbed by roadway construction and maintenance, and ditching.

### 3.2 Wetland Determination

Project biologists delineated 33 wetlands totaling approximately 10.156 acres within the study area for the Kirkland Nickel Project. Figure 3 identifies wetland locations in the study area. Table 3-1 presents a summary of these wetlands. The wetland areas shown represent the total area of wetland delineated, not within the area of impact. The wetlands are located within four basins crossed by the project: East Lake Washington (Yarrow Creek), Forbes Creek, Juanita Creek, and Sammamish River.

**Table 3-1: Summary of Wetlands located within the I-405 Kirkland Nickel Project Study Area**

Wetland Identifier	Drainage Basin	Area (acres)	Cowardin Classification <sup>1</sup>	Status <sup>2</sup>	Riparian Association
16.2R	East Lake Washington	0.847	POW	N	Yes
16.3L	East Lake Washington	0.031	PEM	D	No
16.5L	East Lake Washington	0.064	PEM	D	No
17.1R	East Lake Washington	0.021	PEM	D	No
17.3R	East Lake Washington	0.048	PEM	D	No
17.7R	East Lake Washington	0.096	PEM	D	No
18.05R	East Lake Washington	0.134	PFO	O	No
18.06L	East Lake Washington	0.047	PEM	D	No
18.0R	East Lake Washington	0.102	PEM	SD	No
18.15R	East Lake Washington	0.05	PEM	O	No
18.1R	East Lake Washington	1.309	PFO	O	No
18.2R	East Lake Washington	0.068	PFO	O	No

Wetland Identifier	Drainage Basin	Area (acres)	Cowardin Classification <sup>1</sup>	Status <sup>2</sup>	Riparian Association
18.3R	Forbes Creek	0.028	PFO	O	No
18.4R	Forbes Creek	0.037	PEM	N	No
19.27R	Forbes Creek	0.105	PEM	N	No
19.3R	Forbes Creek	0.249	PFO	N	Yes
19.5L	Forbes Creek	0.574	PEM	O	No
19.6L	Forbes Creek	0.011	PEM	D	No
19.6R	Forbes Creek	0.051	PEM	D	No
19.7R	Forbes Creek	0.252	PSS	N/D	No
19.8L	Forbes Creek	0.341	PEM	S	No
19.9L	Juanita Creek	0.443	PFO	D	No
19.9R	Juanita Creek	0.088	PEM	D	No
20.0L	Juanita Creek	0.08	PEM	D/S	No
20.34L	Juanita Creek	0.279	PEM	O	No
20.35L	Juanita Creek	0.165	PEM	O	No
20.4L	Juanita Creek	2.759	PSS	N	Yes
21.6L	Juanita Creek	0.093	PFO	D	No
21.7L	Juanita Creek	0.242	PFO	O	No
21.8L	Juanita Creek	0.054	PEM	D	No
22.5L	Sammamish River	0.025	PFO	N	Yes
22.8L	Sammamish River	1.156	PFO	N	Yes
23.2L	Sammamish River	0.307	PFO	O	Yes
TOTAL		<b>10.156</b>			

<sup>1</sup> See *Wetland Determinations in Section 2 of this report for an explanation of Wetland Identifier methodology*; PEM = Palustrine Emergent; PFO = Palustrine Forested; PSS = Palustrine Scrub-Shrub; These terms are defined in the Glossary of this document.

<sup>2</sup> Status describes the nature of each wetland as follows: D = ditch, SD = stormwater detention facility, N = natural wetland with stormwater detention capabilities, S = seep wetland, O = other wetland

### 3.2.1 Wetland Descriptions

In the following sections, wetland descriptions are grouped into one of four drainage basins depending on wetland location: East Lake Washington (Yarrow Creek), Forbes Creek, Juanita Creek, and the Sammamish River.

Wetlands are described in location sequence from south to north. Each wetland identified in the field was assigned a number based on its MP location within the study area, starting with MP 15.9 at the south end of the study area and extending north to MP 23.4. The wetland number also includes an "L" if the wetland is located on the left (west) side of I-405 or an "R" if it is located on the right (east) side of I-405 (looking to the north). For example, a wetland found at the midpoint between MP 19 and MP 20 on the left side of I-405 would be Wetland 19.5L.

Thirty-three wetlands were delineated and 49 data plots were established within relatively uniform areas of vegetation in wetland and upland areas. The majority of the wetland descriptions reflect late winter conditions observed when field investigations were conducted in mid-February and early March. Appendix B contains data forms corresponding to formal data plots, state and local wetland rating forms, and functional assessment forms.

### East Lake Washington (Yarrow Creek)

Wetlands in the East Lake Washington (Yarrow Creek) drainage basin are generally located between the southern project boundary or NE 40th Street and the NE 85th Street interchange (MP15.9 to 18.2). Within this section, transportation improvements are proposed for the southbound lanes only between MP 15.9 and 17. North of MP 17 transportation improvements are proposed for both northbound and southbound lanes.

#### **Wetland 16.2R**

*Size and location:* 0.847-acre wetland near the south end of the Kirkland city limits. The wetland is identified as "Yarrow 2" in *Kirkland's Streams, Wetlands, and Wildlife Study* (Watershed Company, 1998). Portions of wetland 16.2R extend out of the project area to the north.

*Vegetation:* Dominated by black cottonwood, red alder, and salmonberry. Douglas-fir and big-leaf maple occur in adjacent upland area to the west and south.

*Soils:* a layer of black (10YR 2/1) silt loam extending to 12 inches, over a subsoil layer of olive brown (2.5Y 4/3) sand.

*Hydrology:* Soils are saturated to the surface in the soil pit, large areas of standing water elsewhere in the wetland.

*Wetland Classification:* Wetland 16.2R is a large PFO wetland that is semi-permanently flooded. It is a Category II wetland under Ecology's rating system and a Type 2I (75-foot buffer) under the City of Kirkland's sensitive areas regulations.

*Wetland Functional Assessment:* This wetland provides the majority of functions evaluated under Null et al. (2000). Because it is depressional with a constricted outlet, it provides flood flow alteration, and nutrient and toxicant removal. It also provides wildlife habitat and native plant richness because it contains multiple vegetation classes and relatively few invasive species.

*Wetland Determination:* The boundary of Wetland 16.2R was flagged where indicators of wetland vegetation, hydric soil, and wetland hydrology were present. These corresponded to the base of the fill for adjacent roads or topographical changes. Adjacent uplands were distinguished from the wetland by the lack of soil saturation and the presence of upland plant species such as Douglas-fir, beaked hazelnut, and sword fern.

#### **Wetland 16.3L**

*Size and location:* 0.03-acre wetland near the south end of the Kirkland city limits, adjacent to I-405 southbound road shoulder. The wetland area has been ditched and carries stormwater runoff from I-405.

*Vegetation:* Dominated by reed canarygrass. Douglas-fir, big-leaf maple, and vine maple occur in adjacent upland area.

*Soils:* A layer of very dark gray (2.5Y 3/1) gravel and sand fill extending to 12 inches, over a subsoil layer of olive brown (2.5Y 4/4) gravel and sand fill.

*Hydrology:* Free water present to the surface in the soil pit, areas of standing water elsewhere in the ditch.

*Wetland Classification:* Wetland 16.3L is a small PEM wetland that is seasonally saturated/inundated. It is a Category IV under Ecology's rating system and a Type 3 (50-foot buffer) under the City of Kirkland's sensitive areas regulations.

*Wetland Functional Assessment:* Principal functions of Wetland 16.3L are sediment removal, and production and export of organic matter. The wetland receives road runoff from I-405, contains dense herbaceous vegetation, and has a surface water connection to a stream.

*Wetland Determination:* The boundary of Wetland 16.3L was flagged where indicators of wetland vegetation, hydric soil, and wetland hydrology were present. These corresponded to the base of fill for adjacent roads or topographical changes. Adjacent uplands were distinguished from the wetland by the lack of soil saturation or hydric soil indicators, and the presence of upland plant species.

#### **Wetland 16.5L**

*Size and location:* 0.064-acre wetland near the south end of the Kirkland city limits, adjacent to I-405 southbound road shoulder. The wetland is adjacent to a roadside ditch that carries stormwater runoff from I-405.

*Vegetation:* Dominated by reed canarygrass and bentgrass.

*Soils:* Surface layer of black (10YR 2/1) loamy sand extending to 5 inches deep, over a B horizon of dark grayish brown (2.5Y 4/2) sand with dark yellowish brown (10YR 4/4) mottles.

*Hydrology:* Soil pit inundated with one inch of water, standing water throughout the wetland.

*Wetland Classification:* Wetland 16.5L is a small PEM wetland that is seasonally saturated/inundated. It is a Category IV under Ecology's rating system and a Type 3 (50-foot buffer) under the City of Kirkland's sensitive areas regulations.

*Wetland Functional Assessment:* Principal functions of Wetland 16.3L are sediment removal, and production and export of organic matter. The wetland receives road runoff from I-405, contains dense herbaceous vegetation, and has a surface water connection to a stream.

*Wetland Determination:* The boundary of Wetland 16.5L was flagged where indicators of wetland vegetation, hydric soil, and wetland hydrology were present. These corresponded to the base of fill for adjacent roads or topographical changes. Adjacent uplands were distinguished from the wetland by the lack of soil saturation or hydric soil indicators, and the presence of upland plant species.

#### **Wetland 17.1R**

*Size and location:* 0.02-acre wetland bordering I-405 near the NE 70th Street exit off-ramp, hydrologically connected to a ditch in the shoulder of the road. This wetland appears to have been intentionally constructed in an area that was historically upland for the purpose of stormwater detention.

*Vegetation:* Dominated by reed canarygrass and bentgrass, with a small number of black cottonwood saplings.

*Soils:* An A horizon that extends to 4 inches depth and is a very dark grayish brown (10YR 3/2) sandy loam. The B horizon extends from 4 inches to at least 16 inches deep and is a dark gray (5Y 4/1) loamy sand with gravels and olive brown (2.5Y 4/3) mottles.

*Hydrology:* Saturated soils at the surface with free water within one inch of the surface in the soil pit, discharges into a catchbasin at its northern boundary.

*Wetland Classification:* Wetland 17.1R is a small PEM wetland that is seasonally saturated/inundated. It is a Category IV under Ecology's rating system and a Type 3 (50-foot buffer) under the City of Kirkland's sensitive areas regulations.

*Wetland Functional Assessment:* Principal functions of Wetland 17.1R are sediment removal, and production and export of organic matter. The wetland receives road runoff from I-405 and contains dense herbaceous vegetation.

*Wetland Determination:* The boundary of Wetland 17.1R was flagged where indicators of wetland vegetation, hydric soil, and wetland hydrology were present. These corresponded to the base of fill for adjacent roads. Adjacent uplands were distinguished from the wetland by topographical change, lack of soil saturation or hydric soil indicators, and the presence of upland plant species.

### **Wetland 17.3R**

*Size and location:* 0.048-acre wetland on the north side of the 72nd Street bridge, between I-405 and a noise wall, hydrologically connected to a ditch receiving water from upstream flow and road runoff. Water flows to a catchbasin at the northern end of the wetland.

*Vegetation:* Dominated by reed canarygrass and bentgrass with some soft rush and watercress.

*Soils:* A deep A horizon extending to at least 16 inches that is a very dark grayish brown (2.5Y 3/2) sand and gravel with strong brown (7.5YR 4/6) mottles.

*Hydrology:* Soils in the soil pit were saturated within 10 inches of the surface.

*Wetland Classification:* Wetland 17.3R is a small PEM wetland that is seasonally saturated/inundated. It is a Category IV under Ecology's rating system and a Type 3 (50-foot buffer) under the City of Kirkland's sensitive areas regulations.

*Wetland Functional Assessment:* Principal functions of Wetland 17.3R are sediment removal, and production and export of organic matter. The wetland receives road runoff from I-405 and contains dense herbaceous vegetation.

*Wetland Determination:* The boundary of Wetland 17.3R was flagged where indicators of wetland vegetation, hydric soil, and wetland hydrology were present. These corresponded to the base of fill for adjacent roads. Adjacent uplands were distinguished from the wetland by topographical change, lack of soil saturation or hydric soil indicators, and the presence of upland plant species.

### **Wetland 17.7R**

*Size and location:* 0.096-acre wetland located south of both the pedestrian / bicycle overcrossing and the NE 85th Street exit between I-405 and a noise wall. Wetland is

hydrologically connected to a ditch receiving water from road runoff and an incoming culvert. The water then flows into a catchbasin at the northern end of the wetland.

*Vegetation:* Dominated by bentgrass, reed canarygrass, and common cattail with some soft rush present.

*Soils:* An A horizon from the surface to 6 inches deep that is a very dark grayish brown (10YR 3/2) sandy loam. The B horizon extends from 6 inches to at least 16 inches deep and is a very dark gray (2.5Y 3/1) sandy gravelly loam with dark yellowish brown (10YR 4/6) mottles.

*Hydrology:* Saturated soils at the surface with free water in the soil pit within 8 inches of the surface.

*Wetland Classification:* Wetland 17.7R is a small PEM wetland that is semi-permanently saturated and seasonally flooded. It is a Category IV under Ecology's rating system and a Type 3 (50-foot buffer) under the City of Kirkland's sensitive areas regulations.

*Wetland Functional Assessment:* Principal functions of Wetland 16.3L are sediment removal, and production and export of organic matter. The wetland receives road runoff from I-405, contains dense herbaceous vegetation, seasonally contains ponded water, and has a surface water connection to a stream.

*Wetland Determination:* The boundary of Wetland 17.7R was flagged where indicators of wetland vegetation, hydric soil, and wetland hydrology were present. These corresponded to the base of the fill for adjacent roads or topographical changes. Adjacent uplands were distinguished from the wetland by the lack of soil saturation for a long period of time, and the presence of upland plant species.

## **Wetland 18.0R**

*Size and location:* 0.101-acre wetland south of the NE 85th Street exit between I-405 and a noise wall. Wetland is hydrologically connected to a ditch and a seep receiving water from road runoff and hillside seeps.

*Vegetation:* Dominated by common velvetgrass and bentgrass with lesser amounts of other hydroseeded grasses.

*Soils:* an A horizon, extending from the surface to 2 inches depth, consisting of very dark grayish brown (10YR 3/2) silty sandy loam. The B horizon extends from 2 inches to 16 inches deep and is a dark grayish brown (2.5Y 4/2) gravelly sandy loam with yellowish brown (10YR 5/6) mottles.

*Hydrology:* Saturated soils at the surface and free water within 2 inches of the surface in the soil pit.

*Wetland Classification:* Wetland 18.0R is a small PEM wetland that is semi-permanently saturated and seasonally inundated. It is a Category IV wetland under Ecology's rating system and a Type 3 (50-foot buffer) under the City of Kirkland's sensitive areas regulations.

*Wetland Functional Assessment:* The principal function of Wetland 18.0R is production of organic matter and its export. Wetland contains dense herbaceous vegetation, and has a surface water connection to a stream.

*Wetland Determination:* The boundary of Wetland 18.0R was flagged where indicators of wetland vegetation, hydric soil, and wetland hydrology were present. These corresponded to the base of fill for adjacent roads, topographic changes, and the

boundary of groundwater seeps. Adjacent uplands were distinguished from the wetland by lack of hydrophytic vegetation or wetland hydrology, and the presence of upland plant species.

#### **Wetland 18.05R**

*Size and location:* 0.134-acre wetland in the southeast portion of the NE 85th Street interchange, bordered by northbound I-405 to the west and the northbound off-ramp to the east, and the cloverleaf to the north. Wetland is hydraulically connected to Wetland 18.1R to the north through a culvert beneath the on-ramp.

*Vegetation:* Dominated by bentgrass, soft rush, velvetgrass, black cottonwood, and paper birch.

*Soils:* An A horizon of greenish gray (Gley 1 5/5GY) gravel and sandy fill with dark yellowish brown (10YR 4/6) mottles.

*Hydrology:* Saturated soils at the surface and free water within 3 inches of the surface in the soil pit.

*Wetland Classification:* Wetland 18.05R is a small PFO wetland that is seasonally saturated/flooded. It is a Category IV wetland under Ecology's rating system and a Category III (50-foot buffer) under the City of Kirkland's sensitive areas regulations.

*Wetland Functional Assessment:* The principal functions of Wetland 18.05R are flood flow alteration, sediment removal, nutrient and toxicant removal, and production and export of organic matter. The wetland receives road runoff, is relatively flat, contains dense herbaceous and deciduous vegetation, and is seasonally inundated.

*Wetland Determination:* The boundary of Wetland 18.05R was flagged where indicators of wetland vegetation, hydric soil, and wetland hydrology were present. These corresponded to the base of the fill for adjacent roads or topographical changes. Adjacent uplands were distinguished from the wetland by lack of wetland hydrology.

#### **Wetland 18.06L**

*Size and location:* 0.047-acre wetland in the southwest portion of the NE 85th Street interchange, primarily within a roadside ditch on a gentle north-facing slope.

*Vegetation:* dominated by reed canarygrass, common cattail, and red alder.

*Soils:* Deep A horizon that extends to at least 16 inches depth and is a black (10YR 2/1) silt loam.

*Hydrology:* Soil saturation to the surface of the soil pit and free water at a depth of 3 inches in the soil pit, standing water throughout the northern portions of the wetland.

*Wetland Classification:* Wetland 18.06L is a PEM wetland that is seasonally saturated/inundated. It is a Category IV under Ecology's rating system and a Type 3 (50-foot buffer) under the City of Kirkland's sensitive areas regulations.

*Wetland Functional Assessment:* Principal functions of Wetland 18.06L are sediment removal, nutrient and toxicant removal, and production and export of organic matter. The wetland receives road runoff from I-405, contains dense herbaceous vegetation, and discharges into a catchbasin.

*Wetland Determination:* The boundary of Wetland 18.06L was flagged where indicators of wetland vegetation, hydric soil, and wetland hydrology were present. These

corresponded to the base of fill for adjacent roads. Adjacent uplands were distinguished from the wetland by topographical change, lack of soil saturation, or hydric soil indicators, and the presence of upland plant species.

#### **Wetland 18.1R**

*Size and location:* 1.309-acre wetland in the southeast portion of the NE 85th Street interchange, on a gentle north-facing slope. The central portions of the wetland are hydrologically connected with ditches.

*Vegetation:* Dominated by willow, red fescue, soft rush, paper birch, and bitter cherry.

*Soils:* Greenish gray (Gley 1 5/5GY) gravel and sand, with dark yellowish brown (10YR 4/6) mottles.

*Hydrology:* Soil saturation to the surface and free water within 6 inches of the surface in the soil pit.

*Wetland Classification:* Wetland 18.1R is a medium-sized PFO wetland that is semi-permanently flooded and occasionally inundated. It is a Category IV under Ecology's rating system and a Type 3 (50-foot buffer) under the City of Kirkland's sensitive areas regulations.

*Wetland Functional Assessment:* The principal function of Wetland 18.1R is production and export of organic matter. The wetland contains deciduous trees, shrubs, and dense herbaceous plants and has a surface water connection to a stream.

*Wetland Determination:* The boundary of Wetland 18.1R was flagged where indicators of wetland vegetation, hydric soil, and wetland hydrology were present. These corresponded to the base of the fill for adjacent roads and topographical changes. Adjacent uplands were distinguished from the wetlands by the lack of hydric soil indicators and the presence of upland plant species.

#### **Wetland 18.15R**

*Size and location:* 0.05-acre wetland in the northeast portion of the NE 85th Street interchange, a narrow swale near the center of the interchange cloverleaf.

*Vegetation:* Dominated by velvetgrass, soft rush, and bentgrass.

*Soils:* An A horizon to 6 inches deep consisting of dark grayish brown (2.5Y 4/2) sandy loam. A B horizon extends to at least 13 inches depth and is also a dark grayish brown (2.5YR 4/2) sandy loam but contains dark yellowish brown (10YR 4/4) mottles. Soils were extremely compacted below 13 inches.

*Hydrology:* Soil saturation at the surface and free water at a depth of 12 inches in the soil pit.

*Wetland Classification:* Wetland 18.15R is a PEM wetland that is seasonally saturated/inundated. It is a Category IV under Ecology's rating system and a Type 3 (50-foot buffer) under the City of Kirkland's sensitive areas regulations.

*Wetland Functional Assessment:* Principal functions of Wetland 18.15R are sediment removal, nutrient and toxicant removal, and production and export of organic matter. The wetland receives road runoff from I-405, contains dense herbaceous vegetation, and discharges into a catchbasin.

*Wetland Determination:* The boundary of Wetland 18.15R was flagged where indicators of wetland vegetation, hydric soil, and wetland hydrology were present. These

corresponded to the base of fill for adjacent roads. Adjacent uplands were distinguished from the wetland by topographical change, lack of soil saturation or hydric soil indicators, and the presence of upland plant species.

### **Wetland 18.2R**

*Size and location:* 0.068-acre wetland east of the northbound I-405 ramp at the NE 85th Street interchange, in a narrow topographic depression near the WSDOT right-of-way fence.

*Vegetation:* Dominated by black cottonwood at the north end with red alder, Douglas spirea, and reed canarygrass occurring throughout the wetland.

*Soils:* An A horizon to 16 inches deep consisting of black (10YR 2/1) gravelly sandy loam.

*Hydrology:* Soils saturated to the surface, and free water was observed within 2 inches of the surface in the soil pit.

*Wetland Classification:* Wetland 18.2R is a small PFO wetland that is seasonally saturated and inundated. It is a Category IV wetland under Ecology's rating system and a Type 3 (50-foot buffer) under the City of Kirkland's sensitive areas regulations.

*Wetland Functional Assessment:* The principal functions of Wetland 18.2R are sediment removal and production and export of organic matter. The wetland has dense herbaceous vegetation and receives road and parking lot runoff. Additionally, the wetland contains deciduous trees and shrubs and has a surface water connection to a stream.

*Wetland Determination:* The boundary of Wetland 18.2R was flagged where indicators of wetland vegetation, hydric soil, and wetland hydrology were present. These corresponded primarily to topographical changes. Adjacent uplands were distinguished from the wetland by the lack of soil saturation or hydric soil indicators, and the presence of upland plant species.

### **Forbes Creek**

Wetlands in the Forbes Creek drainage basin are generally located between the NE 85th Street interchange and the NE 124th Street interchange (MP 18.2 to 19.9). Within this section, transportation improvements are proposed for both southbound and northbound lanes.

### **Wetland 18.3R**

*Size and location:* 0.028-acre wetland northeast of the NE 85th Street interchange, near the northbound I-405 on-ramp, in a narrow topographic depression near the WSDOT right-of-way fence.

*Vegetation:* Dominated by black cottonwood, reed canarygrass, Douglas spirea, and red alder.

*Soils:* An A horizon of black (2.5Y 2.5/1) sandy loam extending to 5 inches depth over a B horizon of black (2.5Y 2.5/1) sand extending to at least 16 inches depth.

*Hydrology:* Saturated soils at the surface and free water within 4 inches of the surface in the soil pit.

*Wetland Classification:* Wetland 18.3R is a small PFO wetland that is seasonally saturated and inundated. It is a Category IV wetland under Ecology's rating system and a Type 3 (50-foot buffer) under the City of Kirkland's sensitive areas regulations.

*Wetland Functional Assessment:* The principal functions of Wetland 18.3R are sediment removal and production and export of organic matter. The wetland has dense herbaceous vegetation and receives road and parking lot runoff. Additionally, the wetland contains deciduous trees and shrubs and has a surface water connection to a stream.

*Wetland determination:* The boundary of Wetland 18.3R was flagged where indicators of wetland vegetation, hydric soil, and wetland hydrology were present. These corresponded primarily to topographical changes. Adjacent uplands were distinguished from the wetland by the lack of soil saturation or hydric soil indicators.

#### **Wetland 18.4R**

*Size and location:* 0.037-acre wetland in a shallow depression southeast of Forbes Lake, just south of a noise wall that borders the WSDOT right-of-way.

*Vegetation:* Dominated by bentgrass and black cottonwood saplings.

*Soils:* Very dark grayish brown (2.5Y 3/2) sandy gravelly loam, extending to below 16 inches depth. No hydric soil indicators. However, the area appears to be a human-induced wetland that receives runoff from I-405. Hydric soil characteristics would be expected to form in the future, assuming the current hydrological conditions persist.

*Hydrology:* No hydric soil indicators. However, the area appears to be a human-induced wetland that receives runoff from I-405. Hydric soil characteristics would be expected to form in the future, assuming the current hydrologic conditions persist. Soil was saturated at one inch deep and free water was observed at 10 inches depth in the soil pit. Areas of standing water were present elsewhere in the wetland.

*Wetland Classification:* Wetland 18.4R is a small PEM wetland that is seasonally saturated/inundated. It is a Category IV wetland under Ecology's rating system and a Type 3 (50-foot buffer) under the City of Kirkland's sensitive areas regulations.

*Wetland Functional Assessment:* The chief functions of Wetland 18.4R are flood flow alteration and sediment removal. The wetland is a hydrologically isolated depression that receives runoff from I-405. Sediment deposits were observed in this wetland during field investigation.

*Wetland Determination:* The boundary of Wetland 18.4R was flagged where indicators of wetland vegetation and wetland hydrology were present. These corresponded to the base of fill for the adjacent road and topographical changes. Adjacent uplands were distinguished from the wetland by lack of soil saturation and the presence of upland plant species.

#### **Wetland 19.27R**

*Size and location:* 0.105-acre wetland south of the NE 116th Street exit, near the WSDOT right-of-way fence and extends downslope toward I-405 and along the road shoulder. Connects to a forested wetland outside of the WSDOT right-of-way to the west that is mapped in *Kirkland's Streams, Wetlands and Wildlife Study* (The Watershed Company, 1998).

*Vegetation:* Dominated by reed canarygrass with some common cattail and soft rush present.

**Soils:** A horizon extends to 12 inches deep, very dark brown (10YR 2/2) sandy loam. The B horizon extends from 12 inches to at least 16 inches deep, dark grayish brown (10YR 4/2) gravelly sandy loam with dark yellowish brown (10YR 4/4) mottles.

**Hydrology:** Saturated soils at the surface and free water in the soil pit at 3 inches below the surface. Several areas of standing water were present. Hand auguring found water within 10 inches of the surface throughout the majority of the wetland.

**Wetland Classification:** Wetland 19.27R is a medium-sized PEM wetland that is semi-permanently saturated and seasonally inundated. It is a Category IV under Ecology's rating system and a Type 3 (50-foot buffer) under the City of Kirkland's sensitive areas regulations.

**Wetland Functional Assessment:** The principal functions of Wetland 19.27R are flood flow alteration, sediment removal, nutrient and toxicant removal, and production and export of organic matter. The wetland receives runoff and floodwaters from adjacent development, contains dense vegetation, and is seasonally inundated. Additionally, the wetland has a surface connection to a stream.

**Wetland Determination:** The boundary of Wetland 19.27R was flagged where indicators of wetland vegetation, hydric soil, and wetland hydrology were present. These corresponded to the base of the fill for adjacent roads and topographical changes. Adjacent uplands were distinguished from the wetland by the lack of soil saturation or hydric soil indicators, and the presence of upland plant species.

### **Wetland 19.3R**

**Size and location:** 0.248-acre south of the NE 116th Street interchange off-ramp, extending east outside of the WSDOT right-of-way and connecting to a forested wetland mapped in *Kirkland's Streams, Wetlands and Wildlife Study* (The Watershed Company, 1998).

**Vegetation:** Dominated by reed canarygrass, bentgrass, and small-fruited bulrush.

**Soils:** An A horizon extending to 15 inches depth that is a very dark grayish brown (10YR 3/2) sandy clay loam. Dark yellowish-brown (10YR 4/6) mottles are present between 6 and 15 inches deep. The B horizon extends from 15 inches to at least 18 inches depth and is a greenish-gray (GLEY 1 5/5GY) sandy clay loam with dark yellowish brown (10YR 4/6) mottles.

**Hydrology:** Saturated soils at the surface and free water present in the soil pit at 10 inches depth. Standing water in the wetland flows north, eventually becoming a channelized stream that discharges to a culvert extending west beneath I-405.

**Wetland Classification:** Wetland 19.3R is a medium-sized PFO wetland that is semi-permanently saturated and seasonally inundated. It is a Category III under Ecology's rating system and a Type 2 (75-foot buffer) under the City of Kirkland's sensitive areas regulations.

**Wetland Functional Assessment:** The principal functions of this wetland are sediment removal and production and export of organic matter. The wetland contains dense vegetation and receives runoff from nearby development. Additionally, the wetland has a surface water connection to a stream.

**Wetland Determination:** The boundary of Wetland 19.3R was flagged where indicators of wetland vegetation, hydric soil, and wetland hydrology were present. These corresponded to the base of the fill for adjacent roads or topographical changes.

Adjacent uplands were distinguished from the wetland by the lack of wetland hydrology indicators and the presence of upland plant species.

#### **Wetland 19.5L**

*Size and location:* 0.574-acre south of the NE 116th Street interchange on-ramp, receives water from road runoff and hillside seeps. Water leaves the wetland through a ditch that extends along the west side of the wetland and into a culvert.

*Vegetation:* Dominated by reed canarygrass, soft rush, and bentgrass with some velvetgrass and western red cedar saplings.

*Soils:* An A horizon extending from the surface to 6 inches depth and consisting of a very dark gray (2.5Y 3/1) silt loam. B horizon extends from 6 inches to 10 inches deep and is a dark gray (2.5Y 4/1) sandy loam with dark yellowish brown (10YR 4/6) mottles. C horizon extends from 10 inches to at least 16 inches depth and is a dark gray (GLEY 1 4/N) sand.

*Hydrology:* Saturated soils at the surface and free water within 10 inches of the surface in the soil pit.

*Wetland Classification:* Wetland 19.5L is a PEM wetland that is seasonally saturated/inundated. It is a Category IV under Ecology's rating system and a Type 3 (50-foot buffer) under the City of Kirkland's sensitive areas regulations.

*Wetland Functional Assessment:* The principal functions of this wetland are sediment removal, nutrient and toxicant removal, and production and export of organic matter. The wetland receives road runoff, contains dense herbaceous vegetation, and a culverted outlet.

*Wetland Determination:* The boundary of Wetland 19.5L was flagged where indicators of wetland vegetation, hydric soil, and wetland hydrology were present. These corresponded to the base of the fill for adjacent roads and topographical changes. Adjacent uplands were distinguished from the wetland by the lack of wetland hydrology indicators and the presence of upland plant species.

#### **Wetland 19.6L**

*Size and location:* 0.011-acre wetland immediately west of the southbound NE 116th Street on-ramp, within a ditch that receives road runoff and releases water into a catchbasin at the northern end of the wetland.

*Vegetation:* Dominated by reed canarygrass and bentgrass.

*Soils:* An A horizon extends from the surface to at least 16 inches depth that is a very dark gray (2.5Y 3/1) gravelly sandy loam with light olive brown (2.5Y 5/6) mottles.

*Hydrology:* Soils with 3 inches of water throughout much of the wetland.

*Wetland Classification:* Wetland 19.6L is a small PEM wetland that is seasonally saturated/inundated. It is a Category IV under Ecology's rating system and a Type 3 (50-foot buffer) under the City of Kirkland's sensitive areas regulations.

*Wetland Functional Assessment:* The principal functions of this wetland are sediment removal and production and export of organic matter. The wetland receives road runoff and contains dense herbaceous vegetation.

*Wetland Determination:* The boundary of Wetland 19.6L was flagged where indicators of wetland vegetation, hydric soil, and wetland hydrology were present. These

corresponded to the base of the fill for adjacent roads and topographical changes. Adjacent uplands were distinguished from the wetland by the lack of wetland hydrology indicators and the presence of upland plant species.

#### **Wetland 19.6R**

*Size and location:* 0.051-acre wetland on the east side of the northbound NE 116th Street interchange off-ramp, hydrologically connected to a ditch receiving water from road runoff, hillside seeps, and a culvert situated at the northeast end of the wetland. Drains to a catchbasin in the northern end of the wetland.

*Vegetation:* Dominated by reed canarygrass.

*Soils:* An A horizon extends from the surface to 6 inches depth and consists of very dark grayish brown (10YR 3/2) sandy loam. The B horizon extends from 6 inches to 11 inches deep, with very dark grayish brown (2.5Y 3/2) sandy loam and strong brown (7.5YR 4/6) mottles. The soil was compact at 11 inches and could not be investigated to any further depth.

*Hydrology:* Saturated soils within 8 inches of the surface and free water present within 10 inches of the surface in the soil pit.

*Wetland Classification:* Wetland 19.6R is a small PEM wetland that is semi-permanently saturated and seasonally inundated. It is a Category IV under Ecology's rating system and a Type 3 (50-foot buffer) under the City of Kirkland's sensitive areas regulations.

*Wetland Functional Assessment:* The principal functions of this wetland are sediment removal and production and export of organic matter. The wetland receives road runoff, contains dense herbaceous vegetation, and has a surface water connection to a stream.

*Wetland Determination:* The boundary of Wetland 19.6R was flagged where indicators of wetland vegetation, hydric soil, and wetland hydrology were present. These corresponded to the base of the fill for adjacent roads and topographical changes. Adjacent uplands were distinguished from the wetland by the lack of wetland hydrology indicators.

#### **Wetland 19.7R**

*Size and location:* 0.252-acre wetland on the east side of I-405, on the north side of NE 116th Street and extending outside the WSDOT right-of-way fence. Contains two topographically different wetland areas: to the south a constructed ditch is adjacent to NE 116th Street and to the north roadside runoff and hillside seeps contribute water to the wetland, which drains through a catchbasin at its southwest end.

*Vegetation:* South end is dominated by Himalayan blackberry, reed canarygrass, and bentgrass with lesser amounts of western red cedar and small-fruited bulrush. The northern hillside seep portion of wetland is dominated by reed canarygrass.

*Soils:* In the south portion, an A horizon extends from the surface to 6 inches deep, with very dark grayish brown (2.5Y 3/2) gravelly loam. The B horizon extends from 6 inches to 10 inches deep and consists of a dark grayish brown (2.5Y 3/2) loam with dark yellowish brown (10YR 4/6) mottles. Soils compacted below 10 inches depth. In the north portion, an A horizon was present from the surface to 3 inches deep, consisting of very dark gray (2.5Y 3/1) silt loam. The B horizon, extending from 3 inches to at least 14 inches depth, is a greenish gray (5/10Y) gravelly silt loam.

*Hydrology:* South end of wetland was inundated with 5 inches of water. The hillside seep portion was saturated to the surface and free water was present at 8 inches below the surface.

*Wetland Classification:* Wetland 19.7R is a PSS wetland that is semi-permanently saturated and seasonally inundated. It is a Category III under Ecology's rating system and a Type 3 (50-foot buffer) under the City of Kirkland's sensitive areas regulations.

*Wetland Functional Assessment:* The principal functions of this wetland are flood flow alteration, sediment removal and production, and export of organic matter. The wetland receives road runoff, contains dense herbaceous vegetation, and has a surface water connection to a stream.

*Wetland Determination:* The boundary of Wetland 19.7R was flagged where indicators of wetland vegetation, hydric soil, and wetland hydrology were present. These corresponded to the base of the fill for adjacent roads and topographical changes. Adjacent uplands were distinguished from the wetland by the lack of wetland hydrology indicators and the presence of upland vegetation, including Himalayan blackberry.

#### **Wetland 19.8L**

*Size and location:* 0.341-acre wetland, south of the NE 124th Street interchange, situated in the WSDOT right-of-way and extending past the right-of-way fence; receives water from road runoff as well as hillside seeps. The water leaves the wetland via a roadside ditch outside of the WSDOT right-of-way to the southwest.

*Vegetation:* dominated by reed canarygrass with lesser amounts of Himalayan blackberry and bentgrass.

*Soils:* An A horizon, extending from the surface to at least 16 inches depth, consisting of a very dark grayish brown (10YR 3/2) loam with dark yellowish brown (10YR 4/6) mottles.

*Hydrology:* Saturated soils at the surface and free water were present at a one inch depth in the soil pit.

*Wetland Classification:* Wetland 19.8L is a PEM wetland that is semi-permanently saturated and seasonally inundated. It is a Category IV under Ecology's rating system and a Type 3 (50-foot buffer) under the City of Kirkland's sensitive areas regulations.

*Wetland Functional Assessment:* The principal function of this wetland is production and export of organic matter. The wetland contains dense herbaceous vegetation and has an outlet from which organic matter is flushed.

*Wetland Determination:* The boundary of Wetland 19.8L was flagged where indicators of wetland vegetation, hydric soil, and wetland hydrology were present. These corresponded to the base of the fill for adjacent roads and topographical changes. Adjacent uplands were distinguished from the wetland by the lack of wetland hydrology indicators and the presence of upland vegetation including Douglas-fir.

#### **Juanita Creek**

Wetlands in the Juanita Creek drainage basin are generally located between the NE 124th Street interchange and the 116th Avenue NE interchange (from MP 19.9 to 22.5).

Within this section, transportation improvements are proposed for the southbound lanes only.

#### **Wetland 19.9L**

*Size and location:* 0.443-acre wetland on the west side of I-405, between the southbound on-ramp of NE 124th Street and I-405, hydrologically connected to a ditch receiving water from road runoff and surface flow.

*Vegetation:* Southern portion is dominated by reed canarygrass and bentgrass with small amounts of evergreen blackberry; the forested northern portion is dominated by red alder with a small amount of willow present.

*Soils:* Southern portion contains an A horizon extending from the surface to at least 16 inches depth, with very dark grayish brown (10YR 3/2) sandy loam and strong brown (7.5YR 4/6) mottles. Northern portion contains an A horizon extending from the surface to 6 inches depth with very dark grayish brown (2.5Y 3/2) sandy loam and light olive brown (2.5Y 5/6) mottles. The B horizon extends from 6 inches to at least 16 inches deep and is a dark gray (5Y 4/1) loam with light olive brown (2.5Y 5/6) mottles.

*Hydrology :* In southern portion, saturated soils within 10 inches of the surface and free water within 16 inches of the surface, in northern portion, saturated soils to the surface and free water within 8 inches of the surface.

*Wetland Classification:* Wetland 19.9L is a PFO wetland that is semi-permanently saturated and seasonally inundated. It is a Category III under Ecology's rating system and a Type 3 (50-foot buffer) under the City of Kirkland's sensitive areas regulations.

*Wetland Functional Assessment:* The principal functions of this wetland are sediment removal, nutrient and toxicant removal, and production and export of organic matter. The wetland receives road runoff, contains dense herbaceous vegetation, and discharges into a catchbasin.

*Wetland Determination:* The boundary of Wetland 19.9L was flagged where indicators of wetland vegetation, hydric soil, and wetland hydrology were present. These corresponded to the base of the fill for adjacent roads and topographical changes. Adjacent uplands were distinguished from the wetland by the lack of wetland hydrology indicators and the presence of upland vegetation.

#### **Wetland 19.9R**

*Size and location:* 0.087-acre wetland located in the southeast quadrant of the 124<sup>th</sup> Street interchange, associated with a ditch that carries stormwater runoff from I-405.

*Vegetation:* Reed canarygrass, soft rush, and Himalayan blackberry with planted Douglas fir and big leaf maple adjacent upland area.

*Soils:* A layer of black (10YR 2/1) silt loam with gravels 16 inches, over a subsoil layer of dark gray (10YR 4/1) sandy loam.

*Hydrology:* Saturated soils at the surface with free water within 15 inches of the surface in the soil pit, discharges into a catchbasin at its northern boundary.

*Wetland Classification:* Wetland 19.9R is a PEM wetland that is seasonally saturated/inundated. It is a Category IV under Ecology's rating system and a Type 3 (50-foot buffer) under the City of Kirkland's sensitive areas regulations.

*Wetland Functional Assessment:* The principal functions of this wetland are sediment removal, nutrient and toxicant removal, and production and export of organic matter. The wetland receives road runoff, contains dense herbaceous vegetation, and a culverted outlet.

*Wetland Determination:* The boundary of Wetland 19.9R was flagged where indicators of wetland vegetation, hydric soil, and wetland hydrology were present. These corresponded to the base of the fill for adjacent roads and topographical changes. Adjacent uplands were distinguished from the wetland by the lack of wetland hydrology indicators and the presence of upland plant species.

#### **Wetland 20.0L**

*Size and location:* 0.080-acre wetland west of the NE 124th Street southbound on-ramp to I-405, includes a roadside ditch and extends upslope as a hillside seep.

*Vegetation:* Hillside seep area was recently cleared of vegetation including red alder saplings and Himalayan blackberry. Bare ground and tire ruts present through much of the wetland. Vegetation in the ditch portion of the wetland is dominated by reed canarygrass and soft rush.

*Soils:* The surface horizon of the soil to 11 inches deep is an olive gray (5Y 4/2) silty clay loam with olive brown (2.5Y 4/3) mottles. The lower soil horizon extends to at least 16 inches deep and is a dark greenish gray (Gley 1 4/10Y) silty clay with dark yellowish brown (10YR 4/4) mottles.

*Hydrology:* Saturation at the surface and free water at a depth of 14 inches in the soil pit, areas of standing water throughout.

*Wetland Classification:* Wetland 20.0L is a PEM wetland that is seasonally saturated/inundated. It is a Category IV under Ecology's rating system and a Type 3 (50-foot buffer) under the City of Kirkland's sensitive areas regulations.

*Wetland Functional Assessment:* The principal functions of this wetland are sediment removal, nutrient and toxicant removal, and production and export of organic matter. The wetland receives road runoff, contains dense herbaceous vegetation, and discharges into a catchbasin.

*Wetland Determination:* The boundary of Wetland 20.L was flagged where indicators of wetland vegetation, hydric soil, and wetland hydrology were present. These corresponded to the base of the fill for adjacent roads and topographical changes. Adjacent uplands were distinguished from the wetland by the lack of hydric soils, wetland hydrology indicators, and the presence of upland plant species.

#### **Wetland 20.34L**

*Size and location:* 0.279-acre PEM wetland northwest portion of the NE 124th Street interchange; consists of two wetland areas connected by an east-to-west swale near the center of the cloverleaf. The western portion is a previously excavated depression that provides stormwater detention, while the eastern portion is generally flat with some landscaped trees and shrubs. This wetland was previously delineated by Herrera Environmental, Inc., and identified as "Wetland D" and "Wetland E" (USDOT et al., 2002).

*Vegetation:* Western portion dominated by common cattail, soft rush, and red alder; eastern end dominated by reed canarygrass, soft rush, and common reed. The swale connecting each portion is dominated by bentgrass and water foxtail.

*Soils:* Western portion has a deep gleyed layer that is a greenish gray (GLEY 2 5/5 BG) sandy clay loam with cobbles; horizon extends to at least 16 inches deep and contains many distinct dark yellowish brown (10YR 4/6) mottles. This area contained one to 12 inches of standing water. The soil in the eastern portion has an A horizon that extends to at least 16 inches deep and is a dark grayish brown (10YR 4/2) sandy loam with dark yellowish brown (10YR 4/6) mottles. Soils in the swale were similar to those found in the eastern portion of the wetland.

*Hydrology:* Western portion contained 1 to 12 inches of standing water. The eastern portion contained two inches of standing water, and standing water was present throughout the swale.

*Wetland Classification:* Wetland 20.34L is a PEM wetland that is semi-permanently saturated and seasonally inundated. It is a Category III wetland under Ecology's rating system and a Type 3 (50-foot buffer) under the City of Kirkland's sensitive areas regulations.

*Wetland Functional Assessment:* The principal functions of this wetland are flood flow alteration, nutrient and toxicant removal, and general habitat suitability. The wetland receives road runoff, contains dense herbaceous vegetation and a deep depression, and is located near a large PSS/PEM wetland.

*Wetland Determination:* The boundary of Wetland 20.34L was flagged where indicators of wetland vegetation, hydric soil, and wetland hydrology were present. These corresponded primarily to topographical changes. Adjacent uplands were distinguished from the wetland by the lack of soil saturation and the presence of upland plant species.

## **Wetland 20.35L**

*Size and location:* 0.165-acre wetland northwest portion of the NE 124th Street interchange. This wetland is identified in *Kirkland's Streams, Wetlands and Wildlife Study* (The Watershed Company, 1998) and was previously delineated by Herrera Environmental, Inc., and identified as "Wetland C" (USDOT et al., 2002).

*Vegetation:* Dominated by bentgrass, reed canarygrass, and Pacific willow.

*Soils:* A layer of very dark grayish brown (2.5Y 3/2) sandy loam extending to 5 inches depth, over a subsoil layer of dark gray (10YR 4/1) sandy clay loam with dark yellowish brown (10YR 4/6) mottles.

*Hydrology:* Soil saturated to the surface and free water within 10 inches of the surface, with areas of standing water in several portions of the wetland.

*Wetland Classification:* Wetland 20.35L is a small PEM wetland that is semi-permanently saturated and seasonally inundated. It is a Category IV wetland under Ecology's rating system and a Type 3 (50-foot buffer) under the City of Kirkland's sensitive areas regulations.

*Wetland Functional Assessment:* The principal functions of this wetland are sediment removal and production and export of organic matter. The wetland receives road runoff, contains dense herbaceous vegetation, and has a surface water connection to a stream.

*Wetland Determination:* The boundary of Wetland 20.35L was flagged where indicators of wetland vegetation, hydric soil, and wetland hydrology were present. These corresponded primarily to topographical changes. Adjacent uplands were

distinguished from the wetland by the lack of soil saturation and the presence of upland plant species.

#### **Wetland 20.4L**

*Size and location:* 2.759-acre wetland near the NE 124th Street interchange. This wetland is identified on NWI maps and is part of a 25-acre PEM/PSS/PFO wetland identified as "Juanita 4" in *Kirkland's Streams, Wetlands and Wildlife Study* (The Watershed Company, 1998). This wetland contains a tributary of Juanita Creek and provides wildlife habitat. It is surrounded by development and contains little or no upland buffer. Wetland 20.4L was previously delineated by Herrera Environmental, Inc., and identified as "Wetland B" (USDOT et al., 2002).

*Vegetation:* Dominated by reed canarygrass, Pacific willow, common cattail, and black cottonwood.

*Soils:* An A horizon that extends to 5 inches deep and is a very dark grayish brown (10YR 3/2) muck. The B horizon extends to at least 16 inches deep and is a dark grayish brown (2.5Y 4/2) gravelly sandy loam with yellowish brown (10YR 5/6) mottles.

*Hydrology:* Saturated soils and inundated to the surface of the soil pit, with areas of standing water throughout the majority of the wetland.

*Wetland Classification:* Wetland 20.4L is a large PSS wetland that is semi-permanently inundated. It is a Category II wetland under Ecology's rating system and a Type 2 (75-foot buffer) under the City of Kirkland's sensitive areas regulations.

*Wetland Functional Assessment:* This wetland provides the majority of functions evaluated under Null et al. (2000). It is part of a large wetland complex with several Cowardin classes, which can store large volumes of water for a long period of time. The wetland is suitable habitat for a variety of wetland-associated animal species.

*Wetland Determination:* The boundary of wetland 20.4L was flagged where indicators of wetland vegetation, hydric soil, and wetland hydrology were present. These corresponded to the base of fill for adjacent roads and development, and topographical changes. Adjacent uplands were distinguished from the wetland by the lack of saturated soil or hydric soil.

#### **Wetland 21.6L**

*Size and location:* 0.093-acre wetland in the I-405 median, north of Kirkland city limits in unincorporated King County and hydrologically connected to a small stream that flows through a pipe beneath the northbound lanes of I-405.

*Vegetation:* dominated by small-fruited bulrush, red alder, Himalayan blackberry, and giant horsetail.

*Soils:* an A horizon of very dark brown (10YR 2/2) sandy silt loam extending to 11 inches deep, over a B horizon of very dark greenish gray (Gley 1 3/10Y) sand with dark yellowish brown (10YR 3/6) mottles.

*Hydrology:* Saturated soils at the surface in the soil pit, with water flowing into the soil pit at a depth of 2 inches.

*Wetland Classification:* Wetland 21.6L is a small PFO wetland that is semi-permanently saturated. It is a Category IV wetland under Ecology's rating system and a Category IV (50-foot buffer) under the King County's sensitive areas regulations.

*Wetland Functional Assessment:* Principal functions of the wetland are erosion control and production and export of organic matter. The stream flowing through the wetland is bordered with deciduous trees and shrubs, and herbaceous vegetation.

*Wetland Determination:* The boundary of Wetland 21.6L was flagged where indicators of wetland vegetation, hydric soil, and wetland hydrology were present. These corresponded primarily to topographical changes. Adjacent uplands were distinguished from the wetland by lack of soil saturation or hydric soil, and the presence of upland plant species.

#### **Wetland 21.7L**

*Size and location:* 0.242-acre wetland situated in the I-405 median, north of Kirkland city limits in unincorporated King County.

*Vegetation:* Dominated by Himalayan blackberry and big leaf maple with some skunk cabbage present in areas of standing water throughout the wetland.

*Soils:* An A horizon composed of a black (7.5YR 2.5/1) silt loam extending to 13 inches deep, over a B horizon of very dark greenish gray (Gley 1 3/5GY) sandy clay loam.

*Hydrology:* Soil was saturated to the surface in the soil pit, with water seeping in at a depth of 7 inches, with areas of standing water in several portions of the wetland.

*Wetland Classification:* Wetland 21.7L is a moderately sized PFO wetland that is semi-permanently saturated and seasonally inundated. It is a Category IV wetland under Ecology's rating system and a Category IV (50-foot buffer) under the King County's sensitive areas regulations.

*Wetland Functional Assessment:* The principal functions of the wetland are flood flow alteration, sediment removal, and nutrient and toxicant removal. The wetland is relatively flat and receives road runoff for I-405. Seasonal ponding occurs in wetland.

*Wetland Determination:* The boundary of Wetland 21.7L was flagged where indicators of wetland vegetation, hydric soil, and wetland hydrology were present. These corresponded to the base of the fill for adjacent roads or topographical changes. Adjacent uplands were distinguished from the wetland by the lack of hydric soil and soil saturation, and the presence of upland plant species.

#### **Wetland 21.8L**

*Size and location:* 0.054-acre wetland situated in the I-405 median, located north of Kirkland city limits in unincorporated King County. Wetland is a narrow ditch flowing south, adjacent to I-405.

*Vegetation:* Dominated by velvet grass, bent grass, and soft rush.

*Soils:* a layer of very dark grayish brown (10YR 3/2) gravelly sandy loam extending to 2 inches, over a subsoil layer of dark gray (5Y 4/1) sandy with dark yellowish brown (10YR 4/6) mottles.

*Hydrology:* Soil saturated to surface and free water present at 10-inch depth in soil pit.

*Wetland Classification:* Wetland 21.8L is a small PEM wetland that is semi-permanently saturated and seasonally inundated. It is a Category IV wetland under Ecology's rating system and a Category IV (50-foot buffer) under the King County's sensitive areas regulations.

*Wetland Functional Assessment:* The principal function of Wetland 21.8L is sediment removal. The wetland contains dense herbaceous vegetation, and receives road runoff from I-405.

*Wetland Determination:* The boundary of Wetland 21.8L was flagged where indicators of wetland vegetation, hydric soil, and wetland hydrology were present. These corresponded to the base of the fill for adjacent roads or topographical changes. Adjacent uplands were distinguished from the wetland by the lack of soil saturation or hydric soil.

## **Sammamish River**

Wetlands in the Sammamish River drainage basin are generally located between the 116th Avenue NE interchange and the northern project boundary (from MP 22.5 to 23.4). Within this section, transportation improvements are proposed for the southbound lanes only.

### **Wetland 22.5L**

*Size and location:* 4.09-acre wetland south of the Brickyard Park-and-Ride lot. Only 0.025 acres of this large forested wetland is located within the study area. Wetland 22.5L was previously delineated by Parametrix, Inc., and identified as “Wetland D” (Parametrix, 2002).

*Vegetation:* Dominated by red alder, Himalayan blackberry, and willow.

*Soils:* An A horizon extending to at least 18 inches deep with black (10YR 2/1) loamy sand with high organic content. The lower 12 to 18 inches contains riprap rocks that have been buried by sediment and organic matter.

*Hydrology:* Saturation to the surface and free water in the soil pit at a depth of four inches, with standing water in several portions of the wetland and channelized flow.

*Wetland Classification:* Wetland 22.5L is a PFO wetland that is semi-permanently saturated and seasonally inundated. It is a Category III wetland under Ecology’s rating system and a Category III (75-foot buffer) under the King County’s sensitive areas regulations.

*Wetland Functional Assessment:* The principal functions of this Wetland 22.5L are flood flow alteration and general habitat suitability. The wetland receives road runoff, contains a forested community, and is associated with a stream.

*Wetland Determination:* The boundary of Wetland 22.5L was flagged where indicators of wetland vegetation, hydric soil, and wetland hydrology were present. These corresponded primarily to topographical changes. Adjacent uplands were distinguished from the wetland by the lack of soil saturation and the presence of upland plant species.

### **Wetland 22.8L**

*Size and location:* 1.156-acre wetland located north of the NE 160th Street interchange hydrologically connected by a small tributary to the Sammamish River.

*Vegetation:* Dominated by reed canarygrass in an emergent area, and Pacific willow, salmonberry, and black cottonwood in the scrub-shrub and forested areas.

*Soils:* Very dark gray (10YR 3/1) sandy loam extending to below 16 inches depth.

*Hydrology:* Saturated soils at the surface and free water within 2 inches of the surface in the soil pit; low to moderate flow in stream and areas of standing water.

*Wetland Classification:* Wetland 22.8L is a moderate-sized PFO wetland that is semi-permanently inundated. It is a Category III wetland under Ecology's rating system and a Type 2 (75-foot buffer) under the City of Bothell's sensitive areas regulations.

*Wetland Functional Assessment:* Principal functions the wetland are sediment removal, flood flow alteration, nutrient and toxicant removal, and production and export of organic matter. Wetland 22.8L receives road and development runoff, can retain fairly high volumes of water, and contains dense herbaceous plants and deciduous trees and shrubs.

*Wetland Determination:* The boundary of Wetland 22.8L was flagged where indicators of wetland vegetation, hydric soil, and wetland hydrology were present. These corresponded to the base of the fill for adjacent roads or topographical changes. Adjacent uplands were distinguished from the wetland by the lack of soil saturation or hydric soil, and the presence of upland plant species.

### **Wetland 23.2L-DT**

*Size and location:* 0.307-acre wetland located south of East Riverside Drive on the Parcell Property. The wetland borders a small tributary to the Sammamish River.

*Vegetation:* Dominant plants in the wetland include red alder, salmonberry, pacific willow, skunk cabbage, reed canarygrass, and lady fern.

*Soils:* an "A1" horizon of very dark grayish brown (10YR 3/2) silt loam extending to 8 inches over an "A2" horizon of very dark grayish brown (10YR 3/2) silt loam with dark yellowish brown (10 YR 3/6) mottles. A "B" horizon occurring from 13 to 17 inches consists of dark olive gray (5Y 3/2) sandy with dark olive brown (2.5Y 3/3) mottles.

*Hydrology:* Saturated soil at a depth of 6 inches in the test pit. Areas of seasonal inundation were observed with the wetland.

*Wetland Classification:* Wetland 23.2L is a small PFO wetland that is semi-permanently flooded. It is a Category III wetland under Ecology's rating system and a Type 2 (75-foot buffer) under the City of Bothell's sensitive areas regulations.

*Wetland Functional Assessment:* This wetland provides the majority of functions evaluated under Null et al. (2000). The wetland contains ponded water, receives runoff from nearby development, and contains deciduous trees and shrubs.

*Wetland Determination:* The boundary of Wetland 23.2L was flagged where indicators of wetland vegetation, hydric soil, and wetland hydrology were present. These corresponded primarily to the base of the fill for adjacent roads or topographical changes. Adjacent uplands were distinguished from the wetland by the lack of hydric soil and soil saturation, and the presence of upland plant species.

### **3.2.2 Wetland Rating and Classification Summary**

Table 3-2 provides a summary of the wetland ratings identified in the wetland descriptions and identifies local wetland buffer requirements.

**Table 3-2: Wetland Ratings, I-405 Kirkland Nickel Project**

<b>Wetland Identifier</b>	<b>Area (acres)</b>	<b>Cowardin Classification</b>	<b>Wetland Category</b>	<b>Local Jurisdiction and Rating</b>	<b>Local Jurisdiction Buffer Requirement (feet)</b>	<b>Identified on Local Jurisdiction Wetland Inventory?</b>
16.2R	0.847	PFO	II	Kirkland - 2	75	Y
16.3L	0.031	PEM	IV	Kirkland - 3	50	N
16.5L	0.064	PEM	IV	Kirkland - 3	50	N
17.1R	0.021	PEM	IV	Kirkland - 3	25	N
17.3R	0.048	PEM	IV	Kirkland - 3	25	N
17.7R	0.096	PEM	IV	Kirkland - 3	25	N
18.05R	0.134	PFO	IV	Kirkland - 3	50	N
18.06L	0.047	PEM	IV	Kirkland - 3	25	N
18.0R	0.102	PEM	IV	Kirkland - 3	25	N
18.15R	0.05	PEM	IV	Kirkland - 3	50	N
18.1R	1.309	PFO	IV	Kirkland - 3	50	N
18.2R	0.068	PFO	IV	Kirkland - 3	50	N
18.3R	0.028	PFO	IV	Kirkland - 3	50	N
18.4R	0.037	PEM	IV	Kirkland - 3	50	N
19.27R	0.105	PEM	IV	Kirkland - 3	50	Y
19.3R	0.249	PFO	III	Kirkland - 2	75	Y
19.5L	0.574	PEM	IV	Kirkland - 3	50	N
19.6L	0.011	PEM	IV	Kirkland - 3	50	N
19.6R	0.051	PEM	IV	Kirkland - 3	50	N
19.7R	0.252	PSS	III	Kirkland - 3	50	N
19.8L	0.341	PEM	IV	Kirkland - 3	50	N
19.9L	0.443	PFO	III	Kirkland - 3	50	N
19.9R	0.088	PEM	IV	Kirkland - 3	50	N
20.0L	0.08	PEM	IV	Kirkland - 3	50	N
20.34L	0.279	PEM	III	Kirkland - 3	50	Y
20.35L	0.165	PEM	IV	Kirkland - 3	50	Y
20.4L	2.759	PSS	II	Kirkland - 2	75	Y
21.6L	0.093	PFO	IV	King Co. - 4	50	N
21.7L	0.242	PFO	IV	King Co. - 4	50	N
21.8L	0.054	PEM	IV	King Co. - 4	50	N
22.5L	0.025	PFO	III	King Co. - 3	75	Y
22.8L	1.156	PFO	III	Bothell - 3	50	N
23.2L	0.307	PFO	III	Bothell - 2	75	N
<b>TOTAL</b>	10.156					

### 3.2.3 Wetland Functions and Values Summary

Table 3-3 summarizes the wetland functional assessment for each wetland description as identified on the functional assessment data sheets (Appendix B).

Generally, larger wetlands in the study area are typically located in flat, low-lying areas. The smaller wetlands are most often located in small closed topographic depressions, or are hydrologically connected to hillside seeps or roadside drainage ditches. Because of their size and topographic location, larger wetlands within the study area are more likely to provide a higher number and higher value of beneficial functions than smaller wetlands.

All of the study area is located within the urban growth area, with most of the study area composed of existing road rights-of-way. All of the wetlands within the study area have been disturbed to some extent by development, including the construction of I-405 and development in the surrounding area. This has affected the ability of the wetlands to provide the beneficial functions identified by Null et al. (2000).

Less than one-half of the wetlands were found to have the potential to provide valuable stormwater management functions, including flood flow alternations, sediment removal, nutrient and toxicant removal, and erosion control. Less than one-fourth of the total number of wetlands are likely to provide value related to general habitat; habitat for amphibians, fish, and/or birds; or native plant richness. Two wetlands (Wetlands 16.2R and 20.4L) are likely to provide uniqueness or heritage value. In addition, two wetlands (Wetland 20.4L and Wetland 22.5L) are likely to provide educational or scientific value. Two of the wetlands are likely to provide general value as fish habitat (Wetland 20.4L and Wetland 22.8L).

**Table 3-3: Wetland Functions and Values, I-405 Kirkland Nickel Project Study Area**

Wetland Identifier <sup>1</sup>	Area (acres)	Cowardin Classification <sup>2</sup>	Washington State Rating	Flood Flow Alteration	Sediment Removal	Nutrient & Toxicant Removal	Erosion Control & Shoreline Stabilization	Production of Organic Matter and its Export	General Habitat Suitability	Habitat for Aquatic Invertebrates	Habitat for Amphibians	Habitat for Wetland-Associated Mammals	Habitat for Wetland-Associated Birds	General Fish Habitat	Native Plant Richness	Educational or Scientific Value	Uniqueness and Heritage
16.2R	0.837	PFO	II	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓		✓
16.3L	0.031	PEM	IV				✓	✓									
16.5L	0.064	PEM	IV		✓		✓	✓									
17.1R	0.021	PEM	IV		✓	✓		✓									
17.3R	0.048	PEM	IV		✓	✓		✓		✓							
17.7R	0.096	PEM	IV		✓	✓		✓									
18.0R	0.101	PEM	IV					✓									
18.05R	0.134	PFO	IV	✓	✓	✓		✓									
18.06L	0.047	PEM	IV		✓	✓		✓									

Wetland Identifier <sup>1</sup>	Area (acres)	Cowardin Classification <sup>2</sup>	Washington State Rating	Flood Flow Alteration	Sediment Removal	Nutrient & Toxicant Removal	Erosion Control & Shoreline Stabilization	Production of Organic Matter and its Export	General Habitat Suitability	Habitat for Aquatic Invertebrates	Habitat for Amphibians	Habitat for Wetland-Associated Mammals	Habitat for Wetland-Associated Birds	General Fish Habitat	Native Plant Richness	Educational or Scientific Value	Uniqueness and Heritage
18.1R	1.309	PFO	IV				✓	✓	✓	✓							
18.15R	0.050	PEM	IV		✓	✓		✓									
18.2R	0.068	PFO	IV		✓	✓		✓									
18.3R	0.028	PFO	IV		✓	✓		✓									
18.4R	0.037	PEM	IV	✓	✓	✓											
19.27R	0.105	PEM	IV	✓	✓	✓	✓	✓	✓								
19.3R	0.248	PFO	III		✓	✓		✓	✓						✓		
19.5L	0.574	PEM	IV	✓	✓	✓		✓		✓							
19.6L	0.011	PEM	IV		✓												
19.6R	0.051	PEM	IV		✓	✓		✓									
19.7R	0.252	PSS	IV	✓	✓	✓		✓		✓							
19.8L	0.341	PEM	IV					✓									
19.9L	0.443	PFO	III		✓	✓		✓									
19.9R	0.087	PEM	IV	✓	✓	✓		✓									
20.0L	0.080	PEM	IV		✓	✓		✓									
20.34L	0.279	PEM	III	✓	✓	✓			✓	✓							
20.35L	0.165	PEM	IV		✓	✓		✓									
20.4L	2.759	PSS	II	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
21.6L	0.093	PFO	IV				✓	✓	✓	✓							
21.7L	0.242	PFO	IV	✓	✓	✓		✓	✓								
21.8L	0.054	PEM	IV		✓			✓									
22.5L	0.025	PFO	III	✓	✓	✓		✓	✓	✓	✓				✓	✓	
22.8L	1.156	PFO	III	✓	✓	✓	✓	✓	✓	✓		✓		✓			
23.2L	0.307	PFO	III	✓	✓	✓	✓	✓	✓	✓		✓			✓		
TOTAL	10.156																

<sup>1</sup> PEM – Palustrine Emergent; PFO – Palustrine Forested; PSS – Palustrine Scrub-Shrub

<sup>2</sup>✓ = function **likely** provided by this wetland



## 4.0 Impacts

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### 4.1 Avoidance and Minimization Measures

The following avoidance and minimization measures have been incorporated into the project design to allow WSDOT to meet the transportation improvement challenge without directly affecting important natural resources:

- Specific wetlands are to be avoided where practicable.
- Associated facilities, such as stormwater treatment systems and access roads are to be located outside of the identified sensitive areas where practicable.
- The project footprint is to be minimized.
- Operational analysis will allow project designers to use existing shoulders or access lanes and thereby limiting the amount of new roadway required.

Specific avoidance and minimization measures are identified in Table 4-1.

### 4.2 Impact Summary

During the course of the Kirkland Nickel Project, all or portions of 14 wetlands in the project corridor will be filled or temporarily disturbed. Of the 1.808 acres of wetland impacted in the this corridor (Table 4-2), approximately 1.599 acres will be directly filled or graded to construct road improvements; another 0.191 acres will be temporarily disturbed; and 0.018 acres will be affected indirectly.

#### Direct

Permanent direct impacts would result from WSDOT filling 1.599 acre of wetland to construct new facilities; diverting or re-directing surface runoff that would be necessary to support wetland hydrology; or filling such a high percentage of the area of a wetland that the remaining area would not function at pre-construction levels (Table 4-2).

#### Temporary

Temporary impacts produce short-term loss of wetland functions during construction and for up to five years following construction. They do not, however, result in a permanent loss of wetlands after the project is completed and once disturbed vegetation or wetland hydrology is reestablished. Approximately 0.191 acres of wetlands would be temporarily disturbed during construction activities, including vegetation clearing and the placement of fill material (Table 4-2).

The extent of short-term degradation would vary depending on the intensity of the temporary impact. Wetlands where the vegetation is cleared or trimmed would still retain some water quality and quantity function, although at a diminished level. Filled wetlands would provide no beneficial functions until they were restored. Wetlands temporarily impacted during construction would be restored to their pre-existing conditions following the completion of work and it is anticipated that they would return to a functioning state within five years.

#### Indirect

In addition, the project will result in approximately 0.018 acres of indirect impacts to wetlands (Table 4-2). Indirect wetland impacts would occur where most of the existing

wetland area would be permanently filled such that the remainder is expected to remain wetland, but may not function at the same level as occurred prior to construction.

**Table 4-1: Filled or Disturbed Wetlands, I-405 Kirkland Nickel Project**

<b>Wetland Identifier</b>	<b>Area (acres)</b>	<b>Permanent Filled or Otherwise Disturbed Area (acres)</b>	<b>Temporary Filled or Otherwise Disturbed Area (acres)</b>	<b>Local Jurisdiction and Rating</b>	<b>Wetland Category</b>	<b>Avoidance and Minimization</b>
16.2R	0.847	0.000	0.000	Kirkland - 2	II	Moved detention pond to avoid impacts.
16.3L	0.031	0.031	0.000	Kirkland - 3	IV	Unavoidable due to roadway design standards.
16.5L	0.064	0.064	0.000	Kirkland - 3	IV	Unavoidable due to roadway design standards.
17.1R	0.021	0.000	0.000	Kirkland - 3	IV	Direct impacts avoided. Temporary impacts to buffer unavoidable during construction.
17.3R	0.048	0.000	0.000	Kirkland - 3	IV	Avoided
17.7R	0.096	0.000	0.000	Kirkland - 3	IV	Avoided
18.05R	0.134	0.000	0.000	Kirkland - 3	IV	Avoided
18.06L	0.047	0.000	0.000	Kirkland - 3	IV	Avoided
18.0R	0.102	0.000	0.000	Kirkland - 3	IV	Avoided
18.15R	0.05	0.000	0.000	Kirkland - 3	IV	Avoided
18.1R	1.309	0.000	0.000	Kirkland - 3	IV	Avoided
18.2R	0.068	0.000	0.000	Kirkland - 3	IV	Avoided
18.3R	0.028	0.000	0.000	Kirkland - 3	IV	Avoided
18.4R	0.037	0.037	0.000	Kirkland - 3	IV	Unavoidable due to roadway design standards.
19.27R	0.105	0.078	0.023	Kirkland - 3	IV	Unavoidable due to roadway design standards.
19.3R	0.249	0.248	0.000	Kirkland - 2	III	Unavoidable due to roadway design standards.
19.5L	0.574	0.574	0.000	Kirkland - 3	IV	Unavoidable due to roadway design standards. Retaining wall added to limit impacts.
19.6L	0.011	0.011	0.000	Kirkland - 3	IV	Unavoidable due to roadway design standards.
19.6R	0.051	0.051	0.000	Kirkland - 3	IV	Unavoidable due to roadway design standards.
19.7R	0.252	0.064	0.028	Kirkland - 3	III	Unavoidable due to roadway design standards.
19.8L	0.341	0.000	0.000	Kirkland - 3	IV	Direct impacts avoided. Temporary impacts to buffer unavoidable during construction.
19.9L	0.443	0.000	0.000	Kirkland - 3	III	Avoided
19.9R	0.088	0.069	0.018	Kirkland - 3	IV	Unavoidable due to drainage requirements.
20.0L	0.08	0.000	0.000	Kirkland - 3	IV	Avoided
20.34L	0.279	0.000	0.000	Kirkland - 3	III	Avoided
20.35L	0.165	0.000	0.000	Kirkland - 3	IV	Direct impacts avoided. Temporary impacts to buffer unavoidable during construction.

Wetland Identifier	Area (acres)	Permanent Filled or Otherwise Disturbed Area (acres)	Temporary Filled or Otherwise Disturbed Area (acres)	Local Jurisdiction and Rating	Wetland Category	Avoidance and Minimization
20.4L	2.759	0.000	0.000	Kirkland - 2	II	Avoided
21.6L	0.093	0.042	0.011	King County - 4	IV	Unavoidable due to existing noise mitigation facilities. Footprint adjusted to minimize impacts.
21.7L	0.242	0.138	0.031	King County - 4	IV	Unavoidable due to existing noise mitigation facilities. Footprint adjusted to minimize impacts.
21.8L	0.054	0.054	0.000	King County - 4	IV	Unavoidable due to existing noise mitigation facilities. Footprint adjusted to minimize impacts.
22.5L	0.025	0.000	0.000	King County - 3	III	Direct impacts avoided. Retaining wall added to limit impacts to buffer.
22.8L	1.156	0.136	0.099	Bothell - 3	III	Unavoidable due to roadway design standards. Retaining wall added to limit impacts.
23.2L-DT	0.307	0.000	0.000	Bothell - 2	III	Direct impacts avoided. Footprint adjusted to avoid impacts.
Total	10.156	1.599	0.207			

**Table 4-2: Summary of Kirkland Nickel Impacted Wetlands (in Square Feet)<sup>1</sup>**

Wetland Name/ID	Wetland Size in Right of Way	Temporary Impacts	Direct Impacts	Indirect Impacts	Local Jurisdiction and Rating	2004 Ecology Rating
16.3L	1,360	0	1,360	0	Kirkland - 3	IV
16.5L	2,802	0	2,802	0	Kirkland - 3	IV
18.4R	1,622	0	1,622	0	Kirkland - 3	IV
19.27R	4,590	984	3,418	0	Kirkland - 3	IV
19.3R	10,823	0	10,823	0	Kirkland - 2	III
19.5L	24,999	0	24,999	0	Kirkland - 3	IV
19.6R	2,216	0	2,216	0	Kirkland - 3	IV
19.6L	481	0	481	0	Kirkland - 3	IV
19.7R	2,778	1,210	2,778	0	Kirkland - 3	III
19.9R	3,811	0	3,021	790	Kirkland - 3	IV
21.6L	4,039	479	1,850	0	King County - 3	IV
21.7L	10,557	1,334	6,016	0	King County - 3	IV
21.8L	2,358	0	2,358	0	King County - 3	IV
22.8L	50,352	4,317	5,905	0	Bothell - 3	III
Total		8,384	69,649	790		
Acres		0.191	1.599	0.018		

<sup>1</sup> Table includes information for impacted wetlands only. An additional 19 wetlands were delineated within the study area but will not be affected by the project.

## 5.0 Preliminary Compensatory Mitigation

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WSDOT will follow the “Project Activities to Avoid Environmental Impacts” and will comply with all applicable environmental procedures, rules, and regulations discussed in the description of the Build Alternative. WSDOT will mitigate for impacts to ensure “no net loss” of wetlands as required by WSDOT policies that follow the State of Washington Executive Order 89-10, Protection of Wetlands. The *Kirkland Nickel Draft Wetland Mitigation Plan* (WSDOT, in progress) discusses the mitigation sites that have been selected for compensatory mitigation and details the mitigation approach for each site.



## 6.0 References

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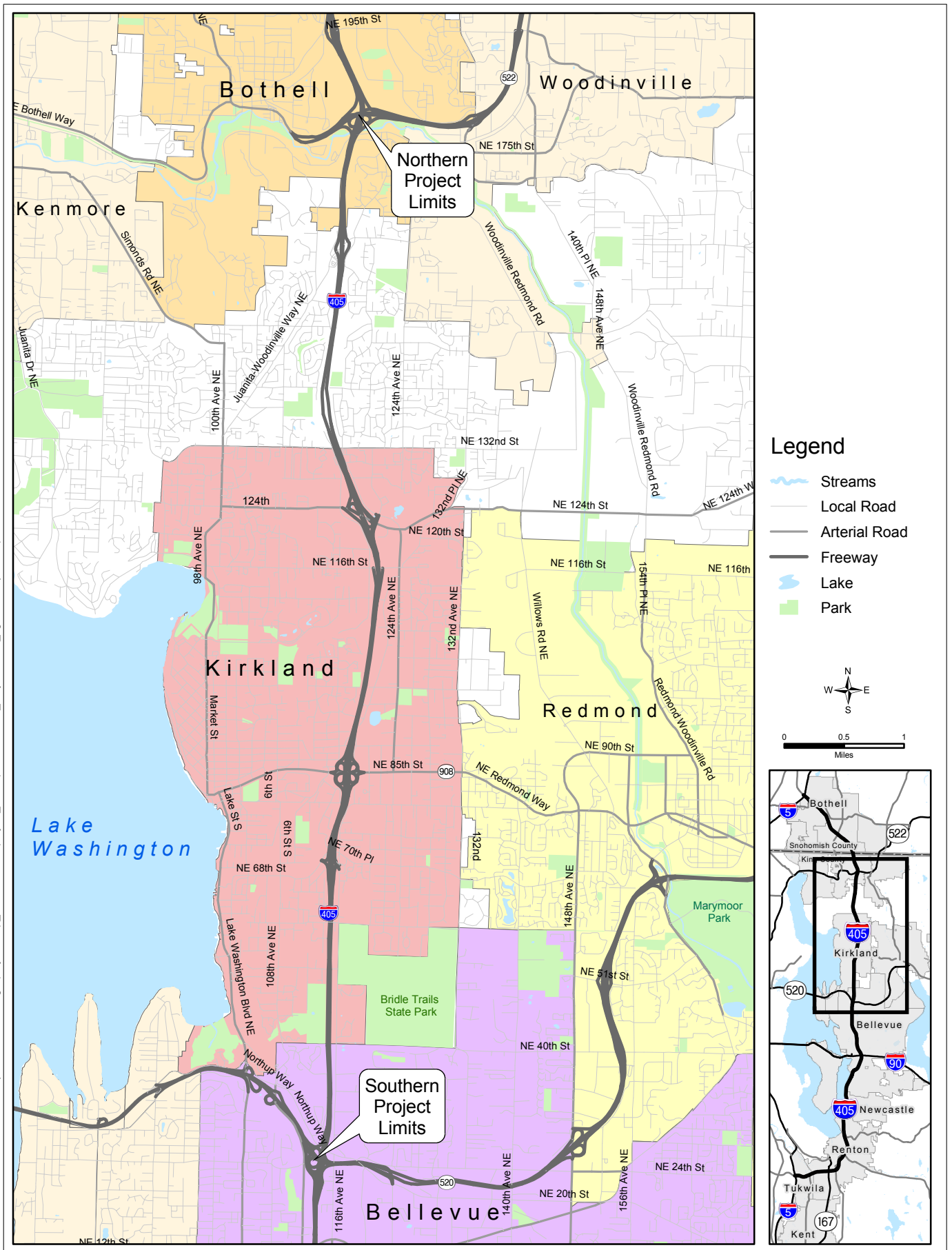
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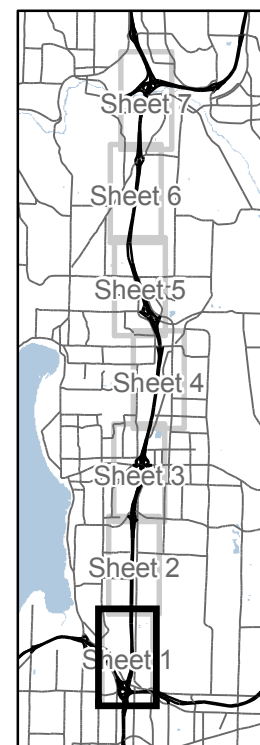
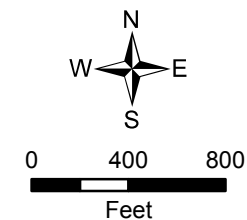
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Source: WSDOT, 2004, HDR, 2004 | \\SEAW4051405gis\project\map\_docs\Kirkland\project\_description\Kirkland\_ProjectLimits\_fig1-1.mxd | Last Updated : 12-20-04



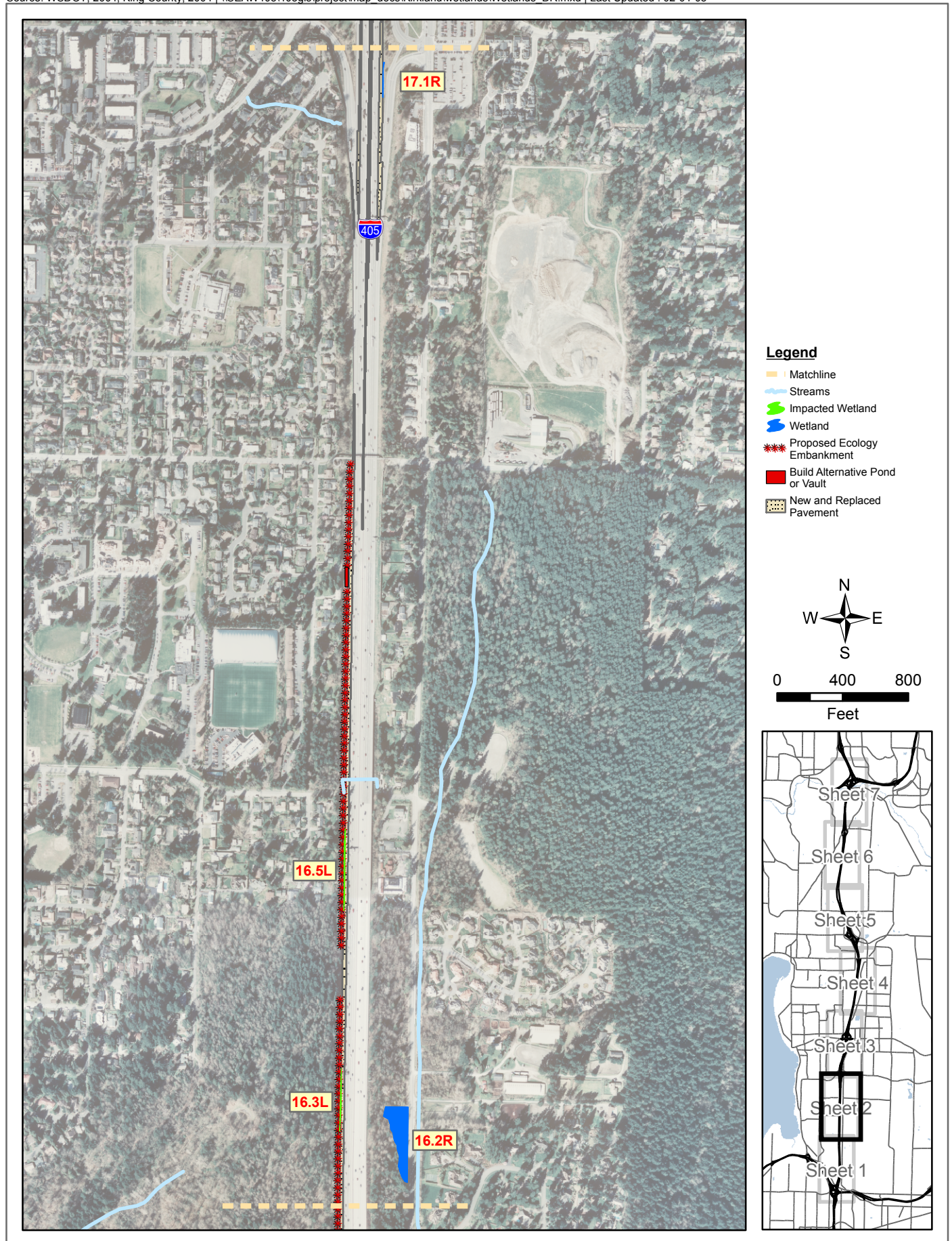
**Kirkland Nickel Project Vicinity**  
**FIGURE 1**





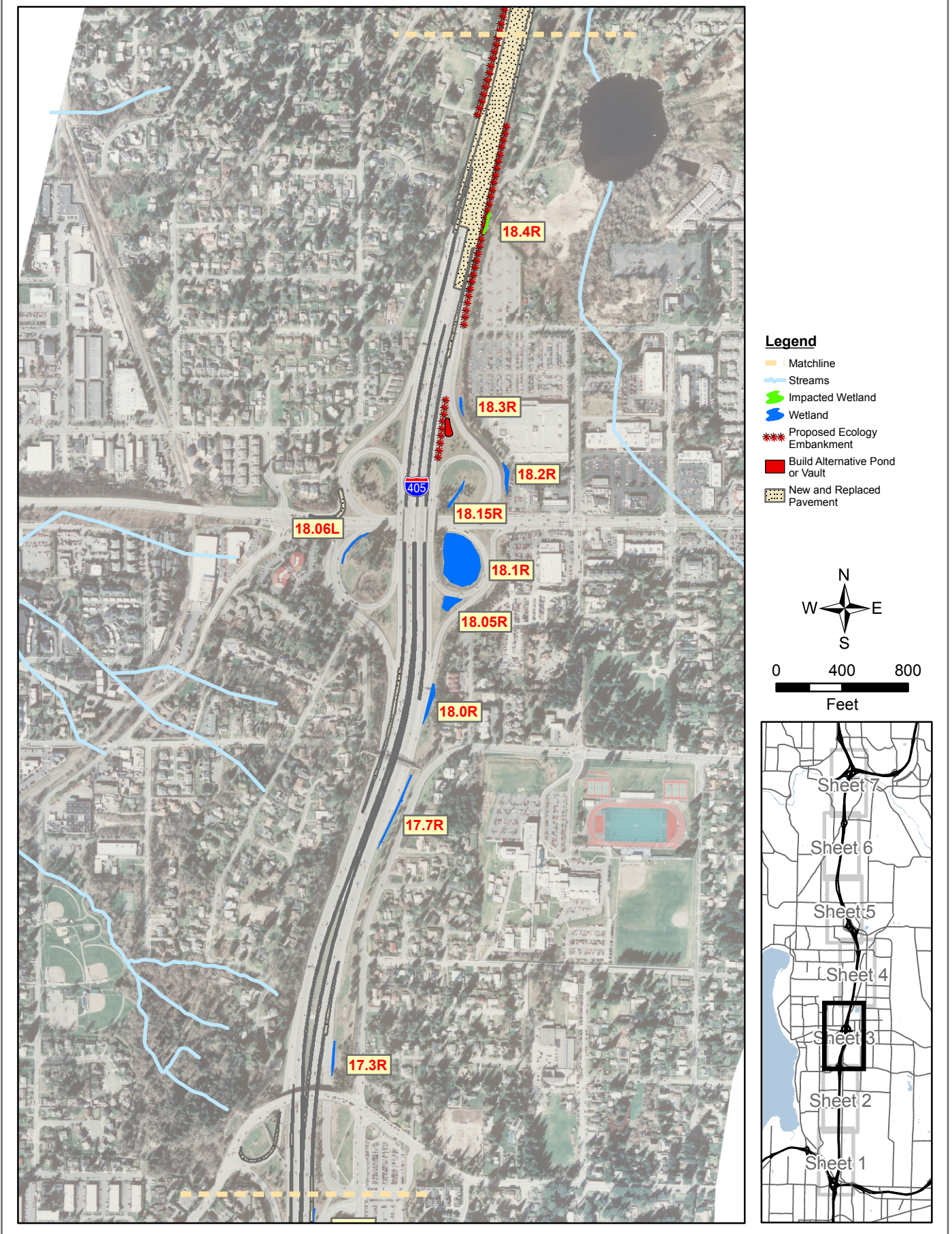
Kirkland Nickel Project Wetlands  
FIGURE 2 | SHEET 1 of 7





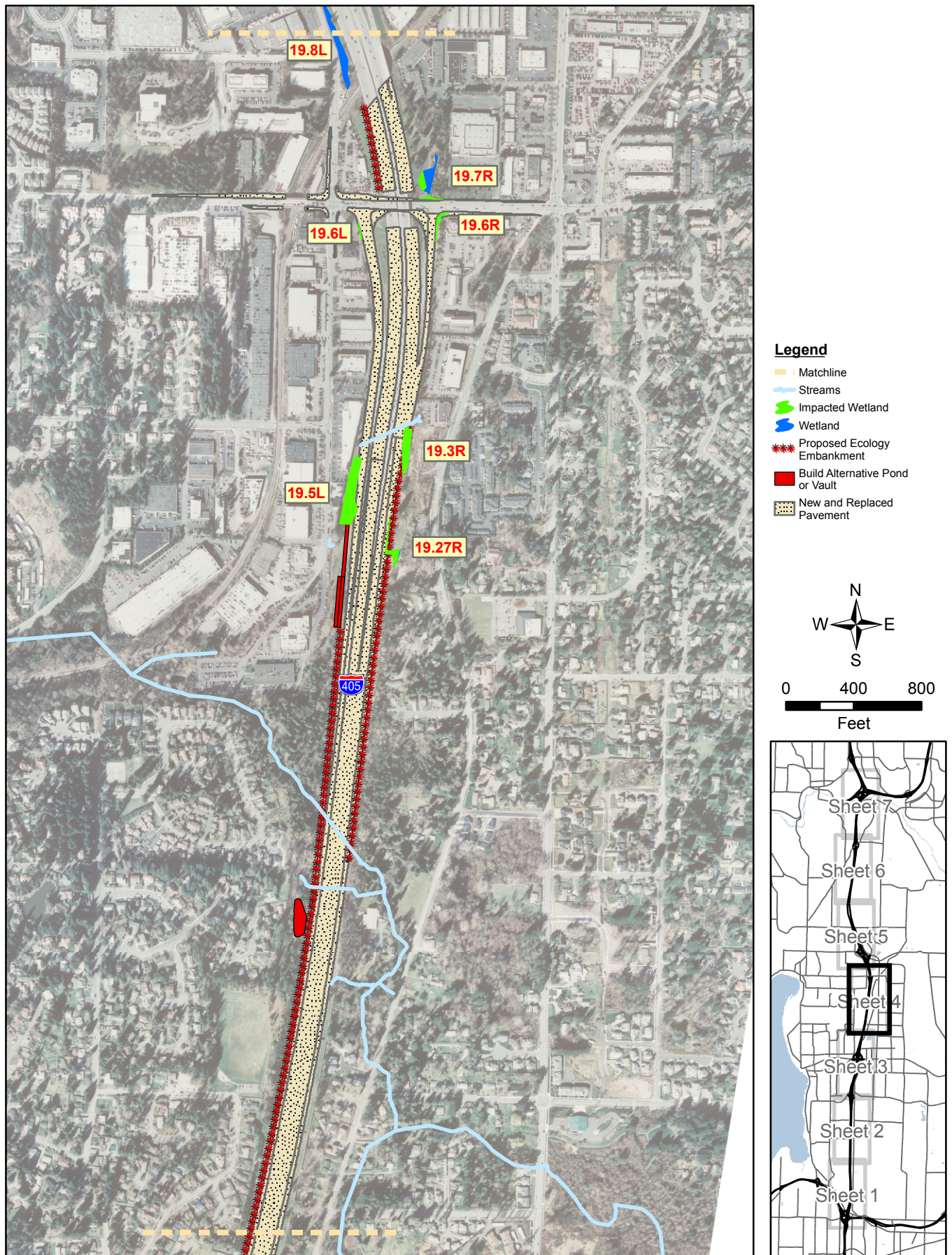
Kirkland Nickel Project Wetlands  
FIGURE 2 | SHEET 2 of 7





Kirkland Nickel Project Wetlands  
FIGURE 2 | SHEET 3 of 7





Kirkland Nickel Project Wetlands  
FIGURE 2 | SHEET 4 of 7



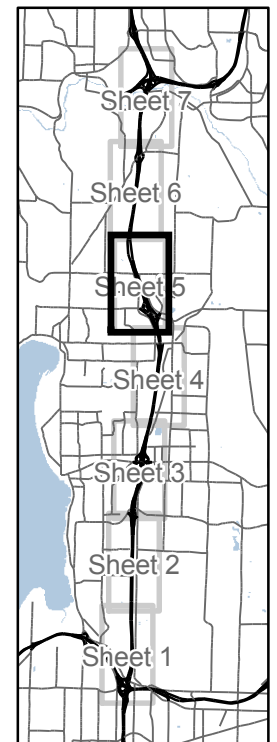


#### Legend

- Matchline
- Streams
- Impacted Wetland
- Wetland
- Proposed Ecology Embankment
- Build Alternative Pond or Vault
- New and Replaced Pavement

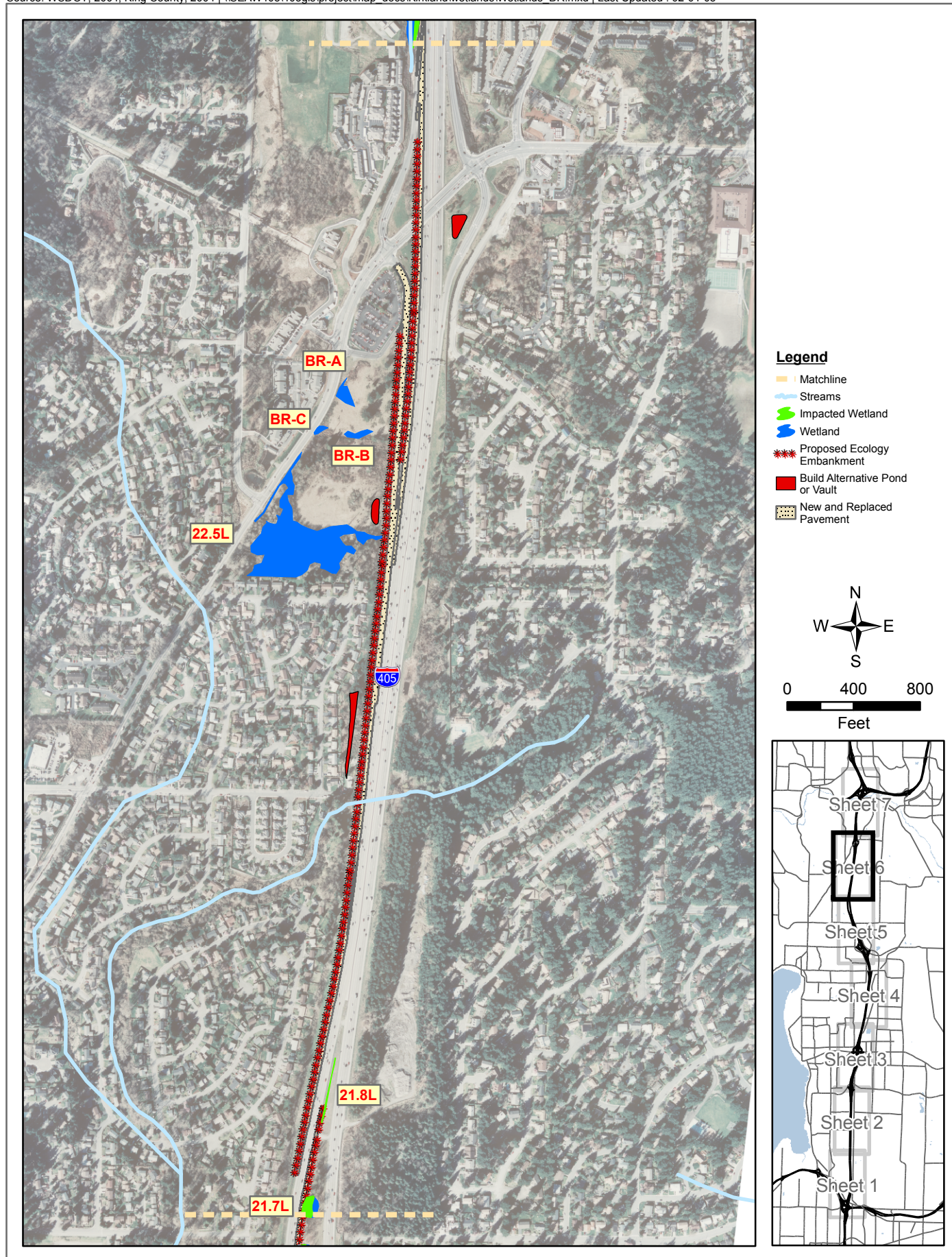


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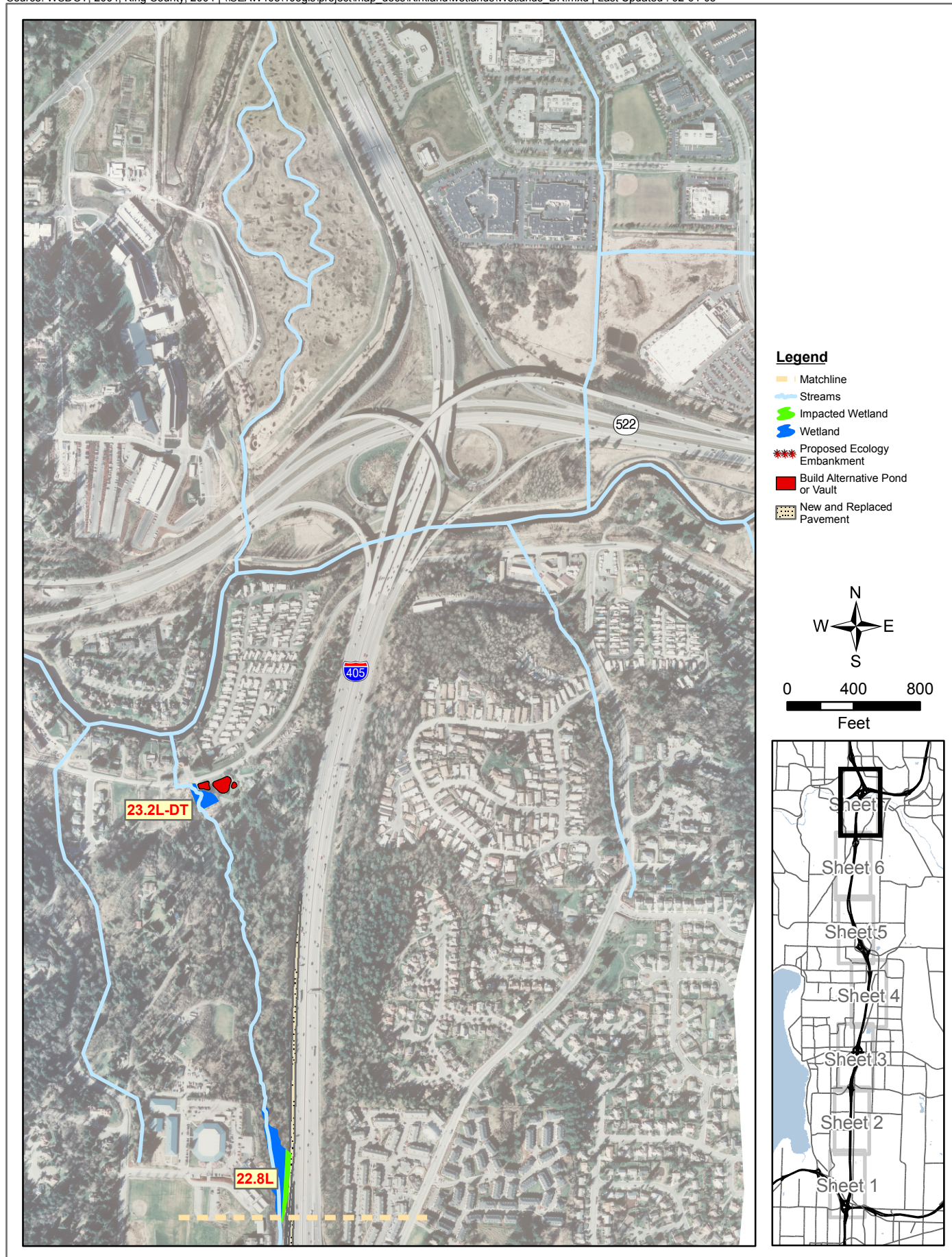
Kirkland Nickel Project Wetlands  
FIGURE 2 | SHEET 5 of 7





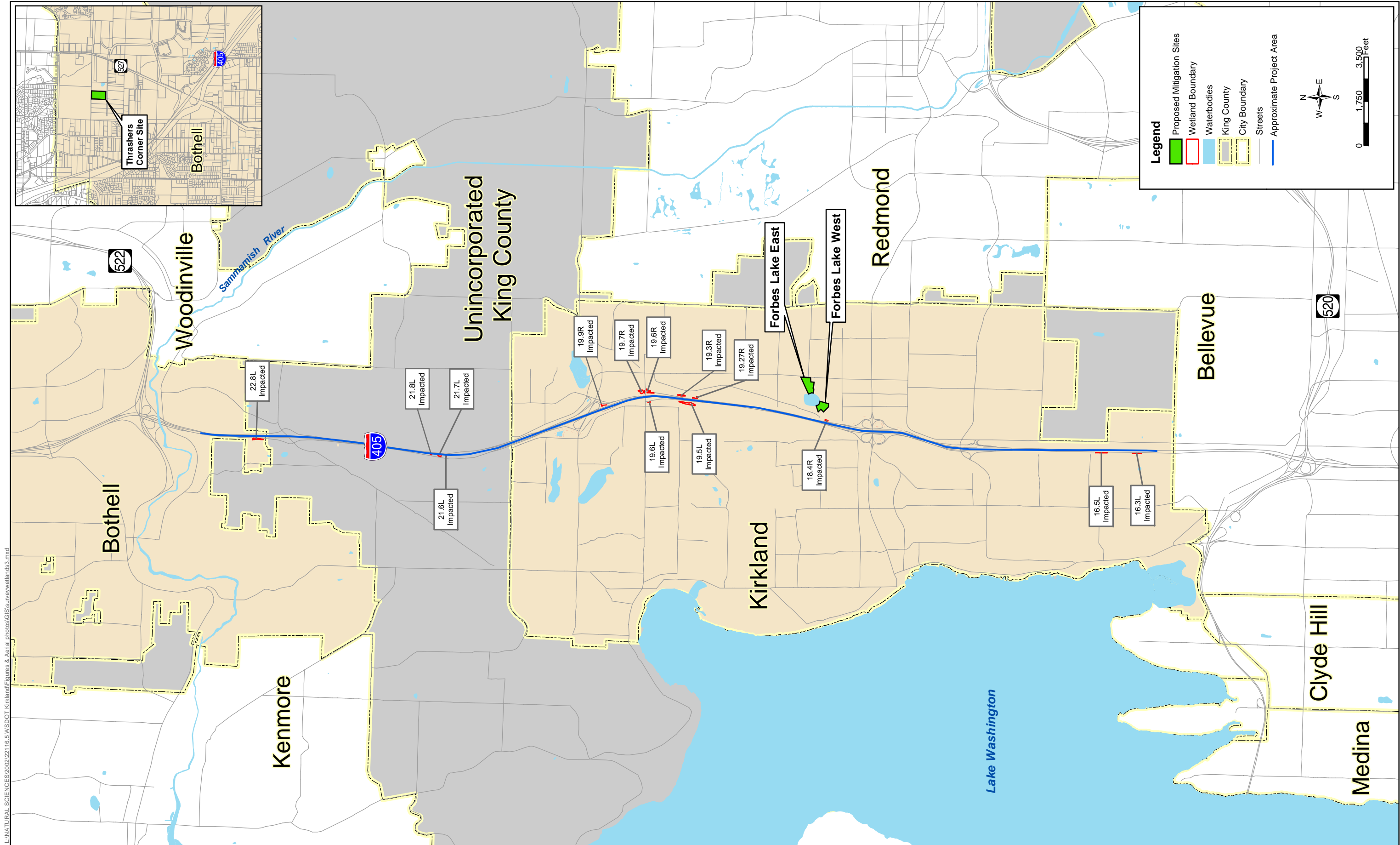
Kirkland Nickel Project Wetlands  
FIGURE 2 | SHEET 6 of 7





Kirkland Nickel Project Wetlands  
FIGURE 2 | SHEET 7 of 7





**Location of Affected Wetlands and Proposed Mitigation**  
**FIGURE 3**



## **Appendix A:**

### **Common and Taxonomic Names of Plants Observed in the Study Area**

**Table A-1: Plant Species List for the  
I-405 Kirkland Nickel Wetlands Study**

Common Name	Scientific Name	WIS1
<b>TREES</b>		
big-leaf maple	<i>Acer macrophyllum</i>	FACU
bitter cherry	<i>Prunus emarginata</i>	FACU*
black cottonwood	<i>Populus balsamifera</i>	FAC
cascara	<i>Rhamnus purshiana</i>	FAC-
Douglas-fir	<i>Pseudotsuga menziesii</i>	FACU*
mountain ash	<i>Sorbus aucuparia</i>	NL
one-fruited hawthorn	<i>Crataegus monogyna</i>	ORN
Oregon ash	<i>Fraxinus latifolia</i>	FACW
Pacific crabapple	<i>Malus fusca</i>	FACW
Pacific madrona	<i>Arbutus menzeisii</i>	NL
paper birch	<i>Betula papyrifera</i>	FAC*
quaking aspen	<i>Populus tremula</i>	FAC
red alder	<i>Alnus rubra</i>	FAC
Sitka spruce	<i>Picea sitchensis</i>	FAC
western hemlock	<i>Tsuga heterophylla</i>	FACU-
western red cedar	<i>Thuja plicata</i>	FAC
<b>SHRUBS</b>		
beaked hazelnut	<i>Corylus cornuta</i>	FACU
black hawthorn	<i>Crataegus douglassii</i>	FAC
black raspberry	<i>Rubus leucodermis</i>	NL
black twin-berry	<i>Lonicera involucrate</i>	FAC+*
clustered rose	<i>Rosa pisocarpa</i>	FAC
currant	<i>Ribes spp.</i>	FAC-FAC+
devil's club	<i>Oplopanax horridus</i>	FAC+
Douglas' spiraea	<i>Spiraea douglasii</i>	FACW
English holly	<i>Ilex aquifolium</i>	NL
English ivy	<i>Hedera helix</i>	NL
evergreen blackberry	<i>Rubus laciniatus</i>	FACU
Himalayan blackberry	<i>Rubus discolor</i>	FACU
honeysuckle	<i>Lonicera spp.</i>	FACU-FAC
Hooker's willow	<i>Salix hookeriana</i>	FACW-
huckleberry	<i>Vaccinium spp.</i>	NL-OBL
Indian plum	<i>Oemleria cerasiformis</i>	FACU
long-leaved Oregon grape	<i>Berberis nervosa</i>	NL

Common Name	Scientific Name	WIS1
Nootka rose	<i>Rosa nutkana</i>	FAC
ocean spray	<i>Holodiscus discolor</i>	NL
Pacific blackberry	<i>Rubus ursinus</i>	FACU
Pacific ninebark	<i>Physocarpus capitatus</i>	FACW-
Pacific willow	<i>Salix lasiandra</i>	FACW+
red elderberry	<i>Sambucus racemosa</i>	FACU
red huckleberry	<i>Vaccinium parvifolium</i>	NL
red-osier dogwood	<i>Cornus stolonifera</i>	FACW
salal	<i>Gaultheria shallon</i>	FACU*
salmonberry	<i>Rubus spectabilis</i>	FAC+
scotchbroom	<i>Cytisus scoparius</i>	NL
Scouler's willow	<i>Salix scouleriana</i>	FAC
Sitka willow	<i>Salix sitchensis</i>	FACW
snowberry	<i>Symphoricarpos albus</i>	FACU
swamp laurel	<i>Kalmia occidentalis</i>	FACW+
tall Oregon grape	<i>Berberis aquifolium</i>	NL
thimbleberry	<i>Rubus parviflorus</i>	FAC-
vine maple	<i>Acer circinatum</i>	FAC-
western snowberry	<i>Symphoricarpos occidentalis</i>	NI
white willow	<i>Salix alba</i>	FACW
HERBS		
American brooklime	<i>Veronica americana</i>	OBL
American vetch	<i>Vicia americana</i>	NI
American waterlily	<i>Nymphaea odorata</i>	OBL
aster	<i>Aster spp.</i>	NL-OBL
bedstraw	<i>Galium spp.</i>	UPL-FACW+
birdsfoot-trefoil	<i>Lotus corniculatus</i>	FAC
bitter nightshade	<i>Solanum dulcamara</i>	FAC+
bracken fern	<i>Pteridium aquilinum</i>	FACU
bull thistle	<i>Cirsium vulgare</i>	FACU
buttercup	<i>Ranunculus spp..</i>	NL-OBL
Canadian goldenrod	<i>Solidago canadensis</i>	FACU
Canadian thistle	<i>Cirsium arvense</i>	FACU+
catchweed bedstraw	<i>Galium aparine</i>	FACU
coltsfoot	<i>Petasites spp.</i>	FAC-FACW
common cat-tail	<i>Typha latifolia</i>	OBL

Common Name	Scientific Name	WIS1
common groundsel	<i>Senecio jacobaea</i>	FACU
common plantain	<i>Plantago major</i>	FACU+
common shepards' purse	<i>Capsella bursa-pastoris</i>	FACU
common speedwell	<i>Veronica officinalis</i>	NL
common St. John's wort	<i>Hypericum perforatum</i>	NL
common tansy	<i>Tanacetum vulgare</i>	NI
common vetch	<i>Vicia sativa</i>	NL
common yarrow	<i>Achillea millefolium</i>	FACU
Cooley's hedge-nettle	<i>Stachys cooleyae</i>	NL
cow parsnip	<i>Heracleum lanatum</i>	FAC+
creeping buttercup	<i>Ranunculus repens</i>	FACW
cress	<i>Rorippa spp.</i>	FAC+-OBL
curly dock	<i>Rumex crispus</i>	FAC+
dandelion	<i>Taraxacum officinale</i>	FACU
deer fern	<i>Blechnum spicant</i>	FAC+
dock	<i>Rumex spp.</i>	FAC-.OBL
duckweed	<i>Lemna minor</i>	OBL
English ivy	<i>Hedera helix</i>	NL
English plantain	<i>Plantago lanceolata</i>	FAC
false lily-of-the-valley	<i>Maianthemum dilatatum</i>	FAC
field horsetail	<i>Equisetum arvense</i>	FAC
fireweed	<i>Epilobium angustifolium</i>	FACU+
foamflower	<i>Tiarella trifoliata</i>	FAC-
forget-me-not	<i>Myosotis spp.</i>	FAC-FACW
foxglove	<i>Digitalis purpurea</i>	FACU*
giant horsetail	<i>Equisetum telmateia</i>	FACW
hairy cats-ear	<i>Hypochaeris radicata</i>	NL
horsetail	<i>Equisetum spp.</i>	FAC-OBL
Japanese knotweed	<i>Polygonum cuspidatum</i>	FACU*
lady fern	<i>Athyrium filix-femina</i>	FAC
large-leaf avens	<i>Geum macrophyllum</i>	FACW-*
licorice fern	<i>Polypodium glycyrrhiza</i>	NL
mint	<i>Mentha spp.</i>	FAC-OBL
mustard	<i>Brassica campestris</i>	NL
oxeye-daisy	<i>Chrysanthemum leucanthemum</i>	NL
Pacific bedstraw	<i>Galium cymosum</i>	FACW
Pacific bleedingheart	<i>Dicentra formosa</i>	FACU*

Common Name	Scientific Name	WIS1
Pacific silverweed	<i>Potentilla anserina</i>	OBL
pearly everlasting	<i>Anaphalis margaritacea</i>	NL
pig-a-back-plant	<i>Tolmiea menziesii</i>	FAC*
pineapple weed	<i>Matricaria matricarioides</i>	FACU
pondweed	<i>Potamogeton spp.</i>	OBL
purple loosestrife	<i>Lythrum salicaria</i>	FACW+
red clover	<i>Trifolium pratense</i>	FACU
scouring horsetail	<i>Equisetum hyemale</i>	FACW
sheep sorrel	<i>Rumex acetosella</i>	FACU+
skunk cabbage	<i>Lysichitum americanum</i>	OBL
smartweed	<i>Polygonum spp.</i>	FACU-OBL
speedwell	<i>Veronica spp.</i>	NL-OBL
sphagnum moss	<i>Sphagnum spp.</i>	NL
spreading bentgrass	<i>Agrostis stolonifera</i>	FAC+
stinging nettle	<i>Urtica dioica</i>	FAC+
strawberry	<i>Fragaria virginiana</i>	NL
sweet coltsfoot	<i>Petasites frigidus</i>	FACW-
sword fern	<i>Polystichum munitum</i>	FACU
thistle	<i>Cirsium spp.</i>	FACU-OBL
vetch	<i>Vicia spp.</i>	NI-NL
water cress	<i>Rorippa nastursium-aquatica</i>	NL
water parsley	<i>Oenanthe sarmentosa</i>	OBL
water starwort	<i>Callitriche spp.</i>	OBL
Watson's willow-weed	<i>Epilobium watsonii</i>	FACW-
western St. John's wort	<i>Hypericum formosum</i>	FAC-
white clover	<i>Trifolium repens</i>	FAC*
GRASSES, RUSHES, AND SEDGES		
bluegrass	<i>Poa spp.</i>	NL-FACW
bulrush	<i>Scirpus spp.</i>	OBL
colonial bentgrass	<i>Agrostis tenuis</i>	FAC
common spike-rush	<i>Eleocharis palustris</i>	OBL
common timothy	<i>Phleum pratense</i>	FAC-
common velvetgrass	<i>Holcus lanatus</i>	FAC
creeping velvetgrass	<i>Holcus mollis</i>	FACU*
Dewey's sedge	<i>Carex deweyana</i>	FACU*
fowl bluegrass	<i>Poa palustris</i>	FAC

Common Name	Scientific Name	WIS1
hardstem bulrush	<i>Scirpus acutus</i>	OBL
Kentucky bluegrass	<i>Poa pratensis</i>	FAC
mannagrass	<i>Glyceria spp.</i>	FACW+-OBL
meadow foxtail	<i>Alopecurus pratensis</i>	FACW
orchard-grass	<i>Dactylis glomerata</i>	FACU
perennial ryegrass	<i>Lolium perenne</i>	FACU
quackgrass	<i>Agropyron repens</i>	FAC-
red fescue	<i>Festuca rubra</i>	FAC+
reed canarygrass	<i>Phalaris arundinacea</i>	FACW
rush	<i>Juncus spp.</i>	FAC-OBL
sedge	<i>Carex spp.</i>	FAC-OBL
slough sedge	<i>Carex obnupta</i>	OBL
small- fruited bulrush	<i>Scirpus microcarpus</i>	OBL
soft rush	<i>Juncus effusus</i>	FACW
spike-rush	<i>Eleocharis spp.</i>	FACW-OBL
spreading bentgrass	<i>Agrostis stolonifera</i>	FAC+
tall fescue	<i>Festuca arundinacea</i>	FAC-
tall mannagrass	<i>Glyceria elata</i>	FACW+
wheatgrass	<i>Agropyron spp.</i>	FACU-FAC

<sup>1</sup> **WIS (Wetland Indicator Status)**

OBL (Obligate): species almost always occur wetlands under natural conditions (est. probability >99%).

FACW (Facultative wetland): species usually occur in wetlands (est. probability 67 to 99%), but are occasionally found in non-wetlands.

FAC (Facultative): Species equally likely to occur in wetlands or non-wetlands (est. probability 34 to 66%).

FACU (Facultative upland): species usually occur in non-wetlands (est. probability 67 to 99%), but are occasionally found in wetlands.

UPL (Upland): species almost always occurring in non-wetlands under normal conditions (est. probability >99%).

NL (Not listed): species not listed and presumed to be upland species.

+ indicates a species more frequently found in wetlands

- indicates a species less frequently found in wetlands

\* identifies a tentative assignment based on either limited information or conflicting reviews

## **Appendix B:**

### **Wetland Data Sheets**

**See Enclosed CD ROM**

**Wetland Delineation Forms**

**Functional Assessment Forms**

**Wetland Rating Forms**



**Appendix E**  
**Groundwater**

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## **GROUNDWATER**

There are no sole-source aquifers in the project area. There is, however, a Kirkland Wellhead Protection Area within the project area. Individual aquifers are small and localized, and are not identified.

### **Construction**

Groundwater quality can be affected by construction stormwater. Measures to protect groundwater quality during construction are described below.

#### Mitigation Measures

- Groundwater will be protected with the use of standard BMPs for construction activities. Construction stormwater collection and conveyance systems will meet the specifications required by WSDOT and Ecology. A SWPPP and SPCC will be implemented for all construction activities along the I-405, SR520 to SR522 Project alignment to prevent and control construction spills and releases and prevent them from affecting underlying groundwater aquifers
- Added measures will be taken during construction within the Kirkland Well Field's Wellhead Protection Area in the vicinity of Bridle Trails State Park to protect the aquifer, such as prohibition of fuel and chemical storage and refueling operations within it. Also, construction specifications will require stormwater collection with either a lined or piped conveyance system within the Wellhead Protection Area. Stormwater will not be discharged to the Kirkland Wellhead Protection Area without treatment to prevent any possible degradation of water quality of these wells from stormwater flows being drawn into the aquifer.

### **Operation**

Road widening and new road surfaces will collectively create 13.56 acres of new impervious surfaces within the I-405, SR520 to SR522 Project area. An additional 43.42 acres of existing impervious surfaces will be retrofitted with improvements for quantity and/or quality stormwater treatments.

#### Mitigation Measures

- Permanent stormwater collection, conveyance, and discharge systems will capture and control spills and prevent untreated stormwater from entering the groundwater aquifers. These stormwater systems will be built in compliance with WSDOT and Ecology regulations.
- Calculations indicate that, at a maximum, only a small amount of stormwater recharge will be prevented by the new impervious surfaces. Where appropriate, infiltration ponds and ecology embankments to increase stormwater recharge to underlying aquifers. Infiltration reduces the impact to base flow by minimizing the amount of stormwater that flows offsite. Infiltration is only feasible in some locations within the project area, due to soils and geology conditions.
- The geotechnical investigation will evaluate the potential effects on downslope seepage of infiltration ponds and ecology embankments. If the assessment indicates that the infiltration facilities at any specific location might result in hillside springs, induce landslides, and/or cause seepage into basements and crawl spaces, the infiltration system will be relocated or redesigned.



*The Draft Wetland Mitigation Plan included in this application was not duplicated here because a version is available in Appendix W2.*

